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APPENDIX B

Phoenix-Goodyear Airport Area Superfund Site

EXPLANATION OF SIGNIFICANT DIFFERENCES #2

for the FINAL REMEDY RECORD OF DECISION

May 1993

I. INTRODUCTION

On September 26, 1989, the United States Environmental Protection Agency (EPA) signed a Record of Decision (ROD) for the final remedy at the Phoenix-Goodyear Airport (PGA) site in Goodyear, Arizona. The State of Arizona concurred with the remedy selected in the 1989 ROD. In January 1991, EPA issued an Explanation of Significant Difference (the 1991 ESD) which modified and clarified the 1989 ROD on five points. EPA now is modifying the ROD a second time to explain the differences between the final remedy originally selected in the 1989 ROD and the final remedy which will be implemented at the site. These changes are not fundamental alterations of the remedy described in the 1989 ROD.

Under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986, and pursuant to 40 C.F.R. Section 300.435(c)(2)(ii) (55 Fed.Reg. 8666, 8852 (March 8, 1990)), EPA is required to publish an ESD when significant (but not fundamental) changes are being considered to a final remedial action plan as described in a ROD. If the changes fundamentally alter the nature of the selected remedy, an amendment to the ROD would be required [40 C.F.R. Section 300.435(c)(2)(ii)]. In this instance, EPA has selected a number of important changes that modify the ROD requirements, but do not alter the hazardous

waste management approach that EPA selected in the ROD. The purpose for each of these changes is described in detail in Section III of this document.

This document provides a brief background of the site, a summary of the remedy selected in the 1989 ROD and how that remedy was modified by the 1991 ESD, a description of how this ESD affects the remedy originally selected by EPA in the 1989 ROD, and an explanation of why EPA is making these changes to the ROD. EPA is issuing this second ESD to the 1989 ROD in order to take into account information received by EPA after EPA issuance of the 1991 ESD.

This ESD changes the remedy selected in the ROD for both the northern and southern portions of the PGA site. The northern portion of the site consists of the Unidynamics-Phoenix Incorporated (Unidynamics) property and groundwater contamination emanating from the Unidynamics property. The southern portion of the site consists of the Loral Defense Systems-Arizona (Loral) property and the Phoenix-Goodyear Airport property and any groundwater contamination emanating from these areas.

This ESD modifies the remedy selected for the northern portion of the site as follows:

(1) change the emission control technology for the Soil Vapor Extraction System from vapor-phase granular activated carbon (GAC) to treatment by thermal oxidation with wet scrubbing;

(2) change the designated end use for water treated by the Subunit C groundwater remedy from incorporation into the community

potable water supply to reinjection back into the Subunit C section of the aquifer with an option for municipal use after 1994[1];

(3) suspend the remedial design and construction of the liquid-phase GAC treatment requirement (or other similar effective technology) from the Subunit A groundwater remedy until treatment plant influent data quality indicates the presence of a less volatile compound (e.g. ketones) at a concentration of 50% or more of its site groundwater cleanup standard;

This ESD modifies the remedy selected for the southern portion of the site as follows:

(4) change the requirement for a centralized air stripping system for the Subunit B/C groundwater remedy to a decentralized system (e.g. two or more independent liquid-phase GAC treatment systems);

(5) change the designated end use for water treated by the Subunit B/C groundwater remedy from municipal use to reinjection back into the Subunit B/C section of the aquifer with an option to reconsider municipal use after 1994[2];

This ESD modifies the selected remedy for both portions of the site as follows:

(6) add the requirement that should any private or municipal drinking water well in the vicinity of the PGA site, including but not limited to City of Goodyear wells number 1,2,3,7,10,11 and the

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[1] An explanation of when municipal end-use may still be considered is explained in Section III.E.

[2] same as footnote 1.

Parkshadows drinking water well, have an occurrence of a contaminant listed in Table 2-5 of the ROD in a concentration in excess of its groundwater clean-up standard and such contamination is related to contamination in the Unidynamics or airport areas, such drinking water well(s) shall be treated as soon as possible by wellhead liquid-phase GAC treatment or other similar technology as approved by EPA.

(7) establish four additional groundwater clean-up standards for Table 2-5 of the ROD as follows:

Benzene - 5 parts per billion (ppb)

Ethylbenzene - 700 ppb

1,1,2,2 Tetrachloroethane - 0.18 ppb

Tetrachloroethene - 5 ppb

This ESD and supporting documentation will become part of the PGA Administrative Record. Copies of the Administrative Record for the PGA site including this ESD have been placed at the following locations:

Avondale Public Library
328 West Western Avenue
Avondale, Arizona 85323
(602) 932-9415

EPA Region 9 Superfund Records Center
75 Hawthorne Street - 9th floor
San Francisco, California 94105
(415) 744-2165

EPA provided a fifteen (15) working day comment period for the State of Arizona in accordance with 40 C.F.R. Section 300.515(h)(3). State of Arizona comments on this ESD are summarized in Section IV of this document and are also included in

the PGA Administrative Record file. Pursuant to 40 C.F.R. Section 300.435(c)(2)(i), a formal public comment period was not required for an ESD. However EPA, at its discretion, established a public comment period of thirty (30) calendar days to obtain written or oral comments on the proposed ESD. This 30 calendar day comment period expired on April 1, 1993. EPA held a public meeting in the City of Avondale on March 10, 1993. A copy of the transcript from the public meeting and copies of all written comments received by EPA have been placed in the administrative record. EPA carefully considered all public comments on the proposed ESD prior to issuance of this final ESD. Community relations activities to support this ESD have been in accordance with 40 C.F.R. Section 300.435(c)(2)(ii) and are further described in Section VI of this document.

II. BACKGROUND

The following provides a brief background of the PGA site, short summaries of the remedy selected in the original 1989 ROD and changes to the 1989 ROD established by the 1991 ESD. Additional background information can be found in the 1989 ROD, the 1991 ESD and in the PGA Administrative Record.

A. Site Background and Description

The PGA site is located primarily in Goodyear, Arizona, approximately seventeen (17) miles west of Phoenix in the western part of the Salt River Valley. A groundwater flow divide splits the site along Yuma Road into northern and southern portions. The northern portion of the site consists of the Unidynamics property,

located at 102 S. Litchfield Road and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from the Unidynamics property. The southern portion of the site consists of the Loral Defense Systems property located at 1300 S. Litchfield Road, the PGA property, and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from the Loral and/or PGA properties. Attachment #1 provides a map indicating the approximate site boundaries of the Phoenix-Goodyear Airport Superfund site. The current land uses on and near the site are agricultural, industrial, and residential.

In 1981, the Arizona Department of Health Services (ADHS) discovered that groundwater in certain areas of the site was contaminated with solvents and chromium. EPA and ADHS conducted additional sampling of wells in 1982 and 1983 which revealed eighteen (18) wells contaminated with trichloroethylene (TCE). As a result, EPA added the PGA site (originally listed as the "Litchfield Airport Area Superfund Site") to the National Priorities List (NPL) on September 8, 1983 (see Federal Register, Vol. 48, No. 175, p. 40671). Other hazardous substances found at the PGA site include acetone, methyl ethyl ketone (MEK), 1,1,1-trichloroethane (TCA), 1,1-dichloroethylene (DCE), other volatile organic compounds (VOCs), and chromium.

Most of the groundwater and soil contamination in the southern portion of the site is located within the Loral and airport properties inside an area of the site designated as Section 16.

Contaminated "shallow groundwater" (hereafter referred to as Subunit A groundwater) within Section 16 was addressed in the first phase of the remedy for the PGA Superfund site and is referred to as the Section 16 Operable Unit. A Record of Decision for the Section 16 Operable Unit was signed on September 29, 1987. The designated remedy of a pump and treat system for Subunit A groundwater has been operating since December 1989. A primary objective of the Section 16 Operable Unit is to protect human health and the environment by preventing the migration of contaminated groundwater and resulting aquifer degradation.

Groundwater currently used for drinking water in the area of the site meets federal and state drinking water standards. However, as municipal water supplies in the area of the site are dependent on groundwater, future population growth in the area could require use of groundwater in contaminated areas and may result in potential exposure to hazardous substances.

The clean-up work in the northern portion of the site is being carried out by Unidynamics, whereas the Goodyear Tire and Rubber Company is the lead party implementing the work in the southern portion of the site. EPA, with the assistance of the Arizona Department of Environmental Quality (ADEQ), authorizes and oversees all clean-up activities at this Superfund site.

B. Remedy Selected in the 1989 ROD

The ROD for the final remedy at the PGA Site was signed by the EPA Regional Administrator on September 26, 1989. In addition to selecting the remedial actions described below, the final remedy

also incorporates the Section 16 Operable Unit. The groundwater clean-up levels for the PGA site are identified in Table 2-5 of the ROD[3]. The groundwater cleanup levels for the Section 16 Operable Unit are identified in Table 2-5 and in Table 1 of the 1987 ROD.

ROD Remedy for Southern Portion of PGA Site

For the southern half of the site, the remedy primarily consists of extraction and treatment of contaminated "deep groundwater" (hereafter referred to as Subunit B/C groundwater) and soil vapor extraction for contaminated soils. The Subunit B/C groundwater remedial action requires a pump and treat system using air stripping to remove VOCs from the groundwater. The ROD states that groundwater remedial action shall consist of three (3) new Subunit B/C groundwater wells for extraction and treatment of Subunit B/C groundwater at a central treatment plant. The ROD states that the central treatment plant may be operated without emissions controls. In addition, the ROD requires that treated water from the central treatment plant will be made available to the City of Goodyear for municipal use. The estimated total present worth cost of the extraction and treatment facilities for the groundwater remedy for the southern portion of the site is $14,500,000.

With respect to VOC soil contamination at the southern portion of the PGA site, the ROD selected a soil vapor extraction (SVE)

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[3] The groundwater cleanup levels in Table 2-5 of the ROD consist of: a) Federal and State of Arizona legally Applicable or Relevant and Appropriate Requirements (ARARs); and, b) other criteria used to ensure the protectiveness of the remedy (known as To Be Considered (TBCs)).

system with emission controls. The SVE system will be implemented in certain required areas within an area identified as Target Area 2 in Figure 5-2 of the ROD. The total present worth cost of the soil remedy for the southern portion is estimated to be from $3,900,000 for a phased implementation, to $5,400,000 for a single phase implementation.

ROD Remedy for Northern Portion of the PGA Site

The remedial action selected for the northern portion of the site is similar to that chosen for the south and includes a Subunit A groundwater remedy, a Subunit C groundwater remedy, and a soil remedy. The Subunit A groundwater remedy consists of a pump and treat system using air stripping, followed by liquid phase granular activated carbon. Vapor-phase GAC air emission controls are required for the Subunit A groundwater remedy. The ROD requires that the treated water from Subunit A groundwater remedy be reinjected, and the treated water from the Subunit C groundwater remedy be incorporated into the community water supply. The estimated present worth cost of the groundwater remedy for the northern portion of the site is $14,000,000.

The soil remedy consists of a SVE system with vapor-phase GAC air emission controls to be implemented in the target area. The ROD identifies the target area as that area where VOCs were detected in soil samples and the area where soil gas samples exhibited VOCs greater than 1 micrograms per liter. The ROD provides that this area may be expanded or reduced, as necessary, to include removal of 99 percent of the contaminants. In addition,

the ROD states that excavation and treatment may be required to remove residual contamination where soil vapor extraction is not effective. The estimated present worth cost of the SVE system is $3,100,000.

C. The 1991 ESD changes to the 1989 ROD

The ESD issued by EPA in January 1991 clarified and modified portions of EPA's September 1989 ROD. To the extent that the 1991 ESD differed from the ROD, the 1991 ESD supersedes the ROD. The 1991 ESD modified the ROD as follows:

(1) The 1991 ESD revised the clean-up level for methyl ethyl ketone (MEK) in groundwater from 170 parts per billion (ppb) to 350 ppb;

(2) The 1991 ESD set a clean-up level for acetone in groundwater at 700 ppb;

(3) The 1991 ESD clarified the target area for the soil remedy in the northern portion of the site and the criteria for establishing the clean-up levels. On page four of the 1989 ROD, the soil remedy target area is described as "that area where VOCs were detected in soil samples and the area where soil gas samples quantified VOCs greater than 1 microgram per liter. The area may be expanded or reduced to include removal of 99 percent of the contaminant". In the 1991 ESD, EPA defined these statements to identify the soil remedy target area for the northern portion of the PGA site to consist of target areas B and C defined by all four circles in Figure 5-7 of the 1989 ROD;

(4) The 1991 ESD clarified the role of soil excavation as a

remedy option, should the selected soil remedy (soil vapor extraction) at the northern portion of the site prove ineffective. The 1989 ROD states on page four that "excavation and treatment may be required to remove residual contamination where soil vapor extraction is not effective." In the 1991 ESD, EPA interpreted this to mean that excavation and treatment of soil is one, but not the only, remedial alternative EPA will consider for the soil in the northern portion of the site if soil vapor extraction is ineffective;

(5) The 1991 ESD revised the selected remedy for an off-site agricultural well referred to as the "Phillips Well" from wellhead treatment to routine water quality monitoring. The 1991 ESD did not alter EPA authority to reimpose the requirement for wellhead treatment at the Phillips Well should future monitoring indicate that the concentration of any VOC has exceeded the clean-up level identified in Table 2-5 of the 1989 ROD. EPA's decision to reimpose wellhead treatment will be based on the Agency's review of water quality sampling results for the Phillips well.

III. DESCRIPTION OF ESD

This ESD modifies portions of EPA's September 1989 ROD. This ESD does not affect the 1991 ESD. To the extent that this ESD differs from the ROD, this ESD shall supersede the ROD upon EPA signature of this ESD. The modifications to the ROD contained in this ESD are described below. Attachment #2 provides a condensed overview of this ESD.

Modifications to the ROD Remedy for PGA Site-North

A. Vapor Treatment for the Soil Vapor Extraction System at the Northern Portion of the Site

The ROD states that the contaminated soils at the PGA site-north (i.e. the Unidynamics area) will be treated by soil vapor extraction with vapor-phase GAC emission controls. This decision was based on known soil contamination data as of mid-1989.

During 1991 and 1992, Unidynamics proceeded with design work for the soil remedy as described in the ROD. All of Unidynamics' design work plans and field activities were subject to EPA approval and oversight. In late 1991, Unidynamics installed two SVE extraction wells within the soil target area designated by the ROD. These SVE extraction wells were then tested for contaminant concentration and pressure data in order to establish the final specifications needed to build the SVE remedy. During this testing, three (3) soil gas samples were collected from the extracted vapor stream, and analyzed by EPA-approved test methods. The results are summarized below in Table 1.

TABLE 1

PRELIMINARY CHARACTERIZATION OF SOIL VAPOR

Compound	Concentrations (ppm volume)			Average
	Sample SVE A-1	Sample SVE A-2	Sample SVE A-3	
Acetone	286	319	292	299
MEK	1327	1590	1515	1477
TCE	436	549	440	475
Totals	2049	2458	2247	2251

ppm = parts per million

The data shown above were utilized to make preliminary calculations to estimate GAC usage rates and were also supplied to equipment vendors as additional data for their use in evaluating equipment requirements. The preliminary estimates of the vapor-phase GAC usage rates indicated extremely high rates, in excess of 4,000 lbs. of GAC per day, which is much higher than the usage rates estimated at the time of the ROD. A 4,000 lbs. per day GAC usage rate would not only cause a significant increase in the overall cost of this soil remedy but also create safety concerns associated with the transport of large volumes of spent, contaminated GAC canisters and the possible release of contaminated GAC in an accident. In addition, scientists have documented that using vapor-phase GAC for treatment of ketones (including methyl ethyl ketone and acetone) may cause safety concerns in regard to potential spontaneous combustion of GAC canisters[4]. As a result of the above information, EPA directed Unidynamics to re-evaluate GAC in addition to other alternatives for the vapor phase treatment.

In the document Evaluation of Alternatives for Treatment of Extracted Soil Vapor during SVE Pilot Testing, dated January 29, 1992 and revised March 13, 1992, Unidynamics evaluated several emissions control technologies for use during an SVE Pilot Testing

[4] For additional information on this subject, see the administrative record for this ESD, document numbers 1, 2, and 3 . The index of documents for the administrative record for this ESD is provided in Attachment #4.

Program[5]. As a result of this evaluation, Unidynamics recommended: a) continued use of SVE for contaminant vapor extraction; and, b) pilot testing thermal oxidation of the extracted contaminant vapors with wet scrubbing of the combustion by-products. In thermal oxidation, the soil vapor is heated, using natural gas or propane, to burn and destroy the vapor contaminants[6]. Non-catalyzed systems typically operate between 1400°F to 1600°F and destruction efficiency can be in excess of 99%. A wet scrubber unit is connected to the thermal oxidation unit to remove hydrochloric acid in the exhaust gas. The wet scrubber operates by spraying water into the exhaust gas, causing the hydrochloric acid to move from the gaseous phase to the liquid phase. Water from the wet scrubber unit can be discharged to a sanitary sewer as long as the acidity of discharged liquid stream is properly controlled.

Thermal oxidation with wet scrubbing was approved by EPA for SVE pilot testing for the following reasons:

- Thermal oxidation is a demonstrated technology for the treatment of soil vapors contaminated by VOCs, and when equipped with a wet scrubber it is accepted by the Maricopa County Bureau of Air Pollution Control as Best Available Control Technology (BACT). With proper operation, destruction efficiencies of greater than 99%

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[5] To review a copy of this document, see the administrative record for this ESD, document number 12.

[6] For more information on thermal oxidation, see administrative record document number 4.

can be achieved for the types of contaminants found in the soil target area at the Unidynamics facility.

- The disposal or regeneration of large volumes of hazardous waste (i.e. GAC canisters) is eliminated, thereby reducing the potential hazards associated with handling and transport.

In accordance with the document entitled Proposed SVE Pilot Testing Program Description, dated October 1992 and revised November 10, 1992, Unidynamics implemented a successful SVE/Thermal Oxidation pilot study during December 1992[7]. The contaminant concentrations detected in exhaust gas exiting the SVE/Thermal Oxidation equipment during the first phase of this pilot study are provided below in Table 2.

TABLE 2
SVE-1 EXHAUST SAMPLE ANALYSIS RESULTS

COMPOUND	COND.1 (ppm)	COND.2 (ppm)	COND.3 (ppm)	COND.4 (ppm)	OSHA PEL[1] (ppm)	ACGIH TLV[2] (ppm)
Acetone	0.67	0.18	0.29	ND	750	750
1,1-Dichloroethylene	ND	ND	0.82	ND	1	5
Methyl Ethyl Ketone (MEK)	2.52	0.72	0.93	0.38	200	200
Tetrachloroethylene	ND	ND	ND	0.02	25	---
Trichloroethylene (TCE)	1.07	0.81	0.86	0.45	50	50

NOTES:
ND - Analyte was not detected at concentrations greater than or equal to the quantitation limit.
[1] Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 permissible exposure limit, 8-hour time-weighted average.
[2] American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value, 8-hour time-weighted average.
ppm = parts per million

[7] Administrative Record Document No. 26.

Under conditions 2 and 3 (Cond.2 and Cond.3) the SVE/Thermal Oxidation system was operated at flowrates of approximately 8 cubic feet per minute (cfm) and 15 cfm respectively. Under conditions 1 and 4, the SVE extraction wells were closed[8]. Average destruction efficiencies (calculated from Conditions 1 and 2 inlet and exhaust contaminant concentration data) achieved during this first phase of the pilot study are as follows:

Compound	Average Destruction Efficiency
Acetone	99.8%
Methyl Ethyl Ketone	98.4%
Trichloroethylene	99.3%

In the report entitled SVE Pilot Testing Final Report, dated February 1993, Unidynamics recommended use of the thermal oxidation technology with wet scrubber unit for the vapor treatment portion of a full-scale soil vapor extraction system[9]. Based on the success of the pilot study, EPA approves of this Unidynamics recommendation. Therefore, this ESD changes the ROD requirement for remediation of the PGA site-north soil target area from SVE with vapor-phase GAC emission controls to SVE with thermal oxidation and wet scrubbing on the exhaust emissions. The ROD and

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[8] The analysis of certain exhaust samples taken during conditions 1 and 4, when the SVE-1 extraction well was closed and no soil vapor was being extracted are likely to be anomalies since no contaminant detections were anticipated under those conditions. Although the levels detected under conditions 1 and 4 were very low and present no significant threat to human health and the environment, these anomalies will be re-tested again when the SVE/Thermal Oxidation system is re-started.

[9] Administrative Record Document No. 29

1991 ESD requirements specifying soil target areas and soil clean-up standards remain unchanged.

B. Subunit A Groundwater Treatment Remedy

The ROD states that the Subunit A Groundwater Treatment Remedy for the PGA site-north consists of pump and treat technology using both air stripping and liquid-phase GAC with vapor-phase GAC treatment of the air emissions. This remedy is scheduled to be implemented in three phases. Phase 1 facilities will be located solely on Unidynamics property and consist of extraction, treatment, and reinjection of Subunit A groundwater contamination plus some limited contribution from Subunit B. Phases 2 and 3 facilities will pump and treat only Subunit A groundwater contamination and will be located generally within the approximate site boundaries north of the Unidynamics property (see Attachment #1).

The liquid-phase GAC component of the treatment remedy was intended to remediate any groundwater contamination consisting of ketones, primarily methyl ethyl ketone (MEK), that was not removed during the air stripping process. Although GAC is not a suitable technology to remove ketones from a contaminated air stream (See Section III.A), GAC can be effective in removing ketones from a liquid stream.

At the issuance of the ROD, EPA determined that the liquid-phase GAC groundwater treatment unit was needed based on two groundwater samples from two different wells at the Unidynamics facility which indicated MEK concentrations of 11,000 ppb and 900

ppb. The MEK clean-up level established by the 1991 ESD is 350 ppb. During 1991 and 1992, EPA directed Unidynamics to implement a special groundwater sampling program to confirm the extent and approximate amount of MEK groundwater contamination. In accordance with the document entitled Special Sampling Event[10] dated February 10, 1992, Unidynamics implemented a focused groundwater testing of the two wells that indicated prior MEK contamination plus a third well which was hydraulically downgradient. As EPA field representatives during this event, the Arizona Department of Environmental Quality (ADEQ) took split samples of the Unidynamics' groundwater samples. The data results of the Special Sampling Event are documented in a Unidynamics' letter report dated March 3, 1992 and an ADEQ letter report[11]. Data results from both the Unidynamics and ADEQ samples indicated non-detectable concentrations of both MEK and acetone.

In April 1992, EPA approved Unidynamics' plan to continue searching for ketone groundwater contamination in the targeted three wells as part of Unidynamics' on-going quarterly well monitoring program. No significant ketone groundwater contamination has been detected to date. Therefore, in the absence of ketone groundwater contamination, this ESD suspends immediate implementation of the liquid-phase GAC unit and requires air stripping alone as the sole Subunit A groundwater remedy treatment

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[10] *Administrative Record Document No. 8*

[11] See Administrative Record Document No. 10 for Unidynamics letter and Administrative Record Document No. 9 for ADEQ letter.

technology. Upon construction of the Subunit A groundwater remedy, EPA intends to take extra efforts to monitor and analyze actual air stripping efficiency, especially during the start-up period, to ensure proper operation of this system.

Furthermore, should a semi-volatile compound, such as methyl ethyl ketone or acetone, be drawn into the Subunit A groundwater remedy in concentrations at or in excess of 50% of a site groundwater clean-up standard, design of a liquid-phase GAC treatment unit or other similar technology as approved by EPA shall be initiated. The treatment technology shall commence operation immediately if the treatment plant influent reaches or exceeds the cleanup standards selected in Table 2-5 of the ROD, as amended. The purpose of initiating such work at a 50% action level is to allow augmentation of the treatment system in a timely fashion in order to maintain continuous compliance with site treatment and rejection requirements without any unnecessary treatment system shut downs. Monitoring efforts for ketone groundwater contamination in the targeted three wells and the influent and effluent streams to and from the Subunit A Groundwater Remedy shall be continued as EPA determines is necessary. Continued monitoring for ketones will facilitate prompt action if such monitoring data indicate that a 50% action level in groundwater has been encountered.

C. Treated Subunit C Groundwater End-use Requirements

The ROD specifies that treated Subunit C groundwater generated by the Subunit C Groundwater Remedy at the northern portion of the

PGA site shall be incorporated into the community potable water supply. This ESD changes the required end use for treated Subunit C groundwater from incorporation into the community potable water supply to reinjection via groundwater injection wells or other similar method, back into the Subunit C section of the aquifer. EPA is making this change to the end use for the treated Subunit C groundwater because it is likely that the costs to the City of Goodyear may be prohibitive based on information provided to EPA by the City for the southern portion of the site (See Section III.E). Reinjection of the treated water back into the Subunit C portion of the aquifer at or near the Unidynamics property still makes this water available to the City of Goodyear for municipal use via extraction by a City of Goodyear municipal well. EPA has determined that reinjection of the treated water at or below the standards established by Table 2-5 of the ROD (as modified by the 1991 ESD and this ESD) is protective of human health and the environment. If conditions allow a municipal end-use to become a cost-effective alternative for a Subunit C groundwater remedy at PGA-north, either the reinjection or a municipal end-use alternative may be submitted for EPA review and approval (see Section III.E for additional explanation).

Modifications to the ROD Remedy for PGA Site-south

D. Treatment Technology for the Subunit B/C Groundwater Remedy.

With respect to the Subunit B/C groundwater remedy for the southern portion of the site, the ROD states that in addition to other requirements, a central treatment plant using the air

stripping technology (without air emission controls) shall be used to treat water from three new extraction wells. This ESD changes the treatment technology for the Subunit B/C groundwater remedy from a centralized air stripping system to two or more independent liquid-phase GAC treatment systems. EPA is making this change to the ROD due to a reduction in the estimated extraction flow rate for the Subunit B/C groundwater remedy and pipeline access difficulties encountered when trying to design a centralized system on Loral and airport properties.

Based on data available at the time of issuance of the ROD, EPA determined that Subunit B/C groundwater contamination emanating from the airport property was substantial and had migrated all the way to the Phillips wells located about two (2) miles west of the airport property. Subsequent to the ROD, EPA directed the Goodyear Tire and Rubber Company to design and implement a detailed Subunit B/C groundwater contamination investigation and delineation program. The work consisted of: (a) investigating and addressing eight old production wells on Loral and airport properties suspected to be conduits of contamination from Subunit A to Subunit B/C groundwater; and, (b) strategically installing seven new Subunit B/C groundwater monitoring wells on the Loral and airport properties.

The results of this investigation are detailed in the report entitled Conceptual (30%) Design Report for the Ground-Water Remedy at the Phoenix-Goodyear Airport Superfund Site in Goodyear,

Arizona, dated November 16, 1992[12]. This report concludes that the Subunit B/C contamination at the Loral/airport facility is much less than the amount identified in the ROD. This reduction in the volume of Subunit B/C contamination has caused the estimated extraction flow rate to decrease from 2200 gallons per minute (gpm) to about 700 gpm. The significantly reduced extraction rate allowed liquid-phase GAC to become a viable treatment alternative. In addition, early in the design process several access problems were identified when attempting to design the extraction and injection well pipeline network for a centralized treatment system. These logistical and access difficulties included locating pipelines around numerous roads, buildings, and railroad tracks as well as Federal Aviation Administration (FAA) requirements which restrict the location and height of an air stripping tower. Use of independent liquid-phase GAC systems reduces the overall length of pipelines necessary for the treatment system and reduces the impact of FAA requirements.

While retaining the pump and treat concept for the remediation of contaminated Subunit B/C groundwater at the southern portion of the PGA site, this ESD changes the treatment technology from a centralized air stripping system (without air emission controls) to two or more independent liquid-phase GAC treatment systems. Although the air stripping remedy described in the ROD was determined EPA to be protective of human health and the

[12] Administrative Record Document No. 27

environment, the liquid-phase GAC systems required by this ESD have an added level of protectiveness since they further reduce the discharge of contaminants into the air.

E. Treated Subunit B/C Groundwater End-use Requirements

The ROD requires that treated water generated by the Subunit B/C Groundwater Remedy for the southern part of the PGA site be provided to the City of Goodyear for municipal use. This ESD changes the ultimate disposition of the treated Subunit B/C groundwater from City of Goodyear municipal use to reinjection (via groundwater injection wells) back into the Subunit B/C section of the aquifer underneath the Loral and/or airport properties. As explained further below, if after 1994 EPA determines that operation and maintenance of Subunit B/C groundwater reinjection wells are not the most cost-effective end-use alternative, plans and specifications for conversion to a municipal end-use may be prepared and submitted for EPA review and approval at that time.

As stated in paragraph D. above, at the writing of the ROD in 1989 EPA estimated that up to 2200 gpm of Subunit B/C groundwater would have to be extracted and treated. Reinjection of the treated water was screened out at that time due to concerns that such a high flow rate of treated water would have necessitated an abundance of costly groundwater injection wells which can be subject to operational difficulties. EPA designated the City of Goodyear as the primary recipient of treated water because of its proximity to the site.

However, as a result of the Subunit B/C investigation

described in paragraph D. above, the extent of Subunit B/C groundwater contamination was decreased, thereby decreasing the extraction flow rate of water to be remediated from about 2200 gpm to about 700 gpm. Because this water is high in naturally occurring total dissolved solids (TDS), TDS levels must be reduced prior to incorporation in a municipal water supply. The City of Goodyear estimated that reduction of TDS to acceptable levels at a 2200 gpm flow rate would cost approximately $13,000,000[13]. EPA is proposing this change to the end use for the treated Subunit B/C groundwater primarily based on the prohibitive cost the City of Goodyear would encounter in accepting this water for municipal use. In addition, the reduced flow rate results in an increased cost-effectiveness of the reinjection alternative by reducing the number of reinjection wells required. Reinjection of the treated water back into the Subunit B/C portion of the aquifer at or near the Loral and/or airport properties still makes this water available to the City of Goodyear for municipal use via extraction by a City of Goodyear municipal well.

Based on comments on the proposed ESD received from the City of Goodyear, EPA is allowing certain limited opportunities for a municipal end-use alternative for treated Subunit B/C groundwater. For Subunit B/C groundwater remedial action planned pursuant to the document Final Design Report for the Subunit B/C Ground-Water Remedy at the Phoenix-Goodyear Airport Superfund Site in Goodyear,

[13] Administrative Record Document No. 5

Arizona and scheduled for construction during 1993 and 1994, the required end-use requirement for treated Subunit B/C groundwater shall be reinjection back into the Subunit B/C portion of the aquifer. If after 1994, EPA determines that operation and maintenance of Subunit B/C groundwater reinjection wells for Subunit B/C groundwater remedial actions are not a cost-effective end-use alternative, plans and specifications for a modified reinjection system or for conversion to a municipal end-use may be prepared and submitted for EPA review and approval at that time. Conversion of end-use alternatives shall not provide an opportunity to delay or suspend remedial action work.

For other Subunit B/C groundwater remedial actions that are not constructed during 1993-94 pursuant to the Goodyear Tire and Rubber Company document entitled Final Design Report for the Subunit B/C Ground-Water Remedy at the Phoenix-Goodyear Airport Superfund Site in Goodyear, Arizona, this ESD requires that either of the following two end-use alternatives to be submitted for EPA review and approval: a) reinjection back into the Subunit B/C portion of the aquifer; or, b) municipal use. This requirement applies to post-1994 Subunit B/C groundwater remedial actions at both PGA-south and PGA-north.

EPA has determined that either alternative, municipal use or reinjection of the treated water, is protective of human health and the environment if such water is treat to a quality at or below the standards established by Table 2-5 of the ROD (as modified by the 1991 ESD and this ESD). It must be noted here that any end use

alternative must be consistent with state laws and may be subject state permitting requirements. The State of Arizona has determined that the reinjection alternative required by this ESD is consistent with state law and not subject to a state permit. However, any attempts to design and implement a municipal end use alternative shall be subject to state and local law including permitting requirements, if any.

Site-wide Modifications

F. Drinking Water Well Protection. This ESD adds the following requirement to the ROD: In the event that any private or municipal drinking water well, including, but not limited to, City of Goodyear wells number 1,2,3,7,10,11, and Parkshadows drinking water well, has an occurrence of a contaminant listed in Table 2-5 of the ROD (as revised by the 1991 ESD and this ESD) at a concentration equal to or in excess of its groundwater clean-up standard, and such contamination is related to releases of contamination at the PGA site north or south, such private or municipal drinking water well(s) shall be treated by wellhead liquid-phase GAC treatment (or other similar technology approved by EPA) as soon as possible. It must be noted here that in order to implement wellhead treatment in a timely fashion, appropriate actions (i.e. remedial design, procurement, and construction activities) should be taken before water quality in a drinking water well attains a contaminant concentration at its groundwater cleanup standard. The immediacy of such proper design, procurement, and construction activities shall be based on EPA assessment of trends in drinking water well

water quality.

Water quality information obtained by or for EPA since 1982 for City of Goodyear municipal wells and the private Parkshadows drinking water wells are provided in the Administrative Record for this ESD[14]. These data indicate that, with some exceptions to date, no City of Goodyear or Parkshadows drinking water wells has had or currently has contamination in excess of the groundwater clean-up standards specified for this site during the times and dates such wells were sampled[15]. These exceptions were each minor in nature. Moreover, EPA does not anticipate that groundwater contamination will in the future be detected at significant levels in the Parkshadows or City of Goodyear municipal drinking water wells at or near the PGA site. However, in order to establish a

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[14] Administrative Record Document No. 31

[15] For the last five years, TCE concentrations in City of Goodyear drinking water wells and the Parkshadows drinking water well have remained at levels less than 1 ppb. Two documented occurrences of TCE concentrations found to be in excess of the 5 ppb TCE site cleanup level are: 1) Well COG#2 had a single occurrence (sample date 4/14/87) indicating 8.0 ppb TCE; and 2) Well COG#1 had a single occurrence (sample date 5/17/84) indicating 6.8 ppb TCE. Other single exceedences of the TCE cleanup level in well COG#3 (sample date 10/09/87) and the Parkshadows drinking water well (sample date 7/19/88) appear to be erroneous since these particular sample results are not consistent with historical sampling data for these wells which have consistently shown TCE levels at less than 1 ppb TCE. City of Goodyear wells numbers 4 and 5 have had documented TCE concentrations above the TCE clean-up standard (see Administrative Record Document No. 31). However, well number 4 had been used primarily for fire protection and not for drinking water. Well number 4 was appropriately abandoned by filling the well with cement to the land surface. TCE concentrations above 5 ppb were first detected in well COG#5 in July 1985, but this well had been permanently disconnected from the City's service system in September 1983. Therefore, COG#5 was not being used for drinking water purposes at times when TCE concentrations above 5 ppb was present in water generated by this well.

clear directive for protection of public health in the case of this unlikely event, EPA has decided to add the wellhead treatment requirement as described above. It must be noted that this drinking water wellhead treatment requirement may not be determined by EPA to be an adequate long-term response action for groundwater contamination of a drinking water well. The purpose of this well-head treatment requirement is to protect public heath in a timely fashion by ensuring the quality of drinking water being extracted from drinking water wells in or near the PGA site.

G. Groundwater Clean-up Levels for Benzene, Ethylbenzene, 1,1,2,2 Tetrachloroethane, and Tetrachloroethene. Table 2-5 of the ROD provides the groundwater clean-up standards for the PGA site. The 1991 ESD revised the MEK groundwater clean-up standard to be 350 ppb and adopted 700 ppb as the groundwater clean-up standard for acetone. During the 1992 soil gas testing in the soil target area at the Unidynamics facility, four contaminants were detected that were not detected at the writing of the ROD or the 1991 ESD. These four new contaminants are benzene, ethylbenzene, 1,1,2,2-tetrachloroethane, and tetrachloroethene (also known as perchloroethene or PCE). Because migration of these contaminants to groundwater is possible, EPA has added clean-up levels for these contaminants to Table 2-5 of the ROD. In addition, groundwater clean-up levels for these four contaminants are needed to determine their corresponding clean-up levels in the soil upon applying the EPA-approved contaminant transport model. As with all other Table 2-5 contaminants, the soil clean-up levels for these four new

contaminants shall be determined based upon a decision-tree described in the ROD and are related to their clean-up levels in groundwater.

It must be noted here that consistent with the "petroleum exclusion" allowed by CERCLA, the groundwater cleanup standards for benzene and ethylbenzene are not applicable to actions related to the clean up of petroleum products released from a petroleum underground storage tank.

EPA has added clean-up levels for these four new contaminants to Table 2-5 of the ROD as follows:

Benzene : 5 micrograms per liter or 5 ppb[16]

Ethylbenzene: 700 micrograms per liter or 700 ppb[17]

Tetrachloroethene: 5 micrograms per liter or 5 ppb[18]

1,1,2,2-tetrachloroethane: 0.18 micrograms per liter or 0.18 ppb[19]

The above groundwater clean-up standards for benzene, tetrachloroethene, and ethylbenzene are the maximum concentrations levels (MCLs) for these contaminants established by the Safe Drinking Water Act. Therefore, the clean-up standards for benzene,

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[16] Reference: Region 9 Environmental Protection Agency Drinking Water Standards and Health Advisories Table, December 1992 (see Administrative Record Document No. 30).

[17] same as 13.

[18] same as 13.

[19] Reference: Human Health-based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil, Arizona Department of Environmental Quality, June 1992. (see Administrative Record Document No. 16).

tetrachloroethene and ethylbenzene are ARARs.

Since the MCL for tetrachloroethene had not been established in 1987, EPA set its groundwater clean-up level to be 3 ppb in Table 1 of the 1987 ROD. Therefore, this action hereby modifies the tetrachloroethene groundwater clean-up level listed in Table 1 of the 1987 ROD to be 5 ppb in addition to adding this same level to Table 2-5 of the 1989 ROD.

In the absence of an MCL and EPA risk reference dose data, the groundwater clean-up standard for 1,1,2,2-tetrachloroethane is based on the ADEQ action level for groundwater found in the ADEQ document Human Health-Based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil, dated June 1992. Since ADEQ does not promulgate their action levels, the clean-up standard for 1,1,2,2-tetrachloroethane is a "to-be-considered" (TBC) clean-up level and not an ARAR.

Attachment #3 provides an updated version of Table 2-5 after incorporating modifications established by the 1991 ESD and by this ESD.

IV. SUPPORT AGENCY COMMENTS

The Arizona Department of Environmental Quality (ADEQ) and the Arizona Department of Water Resources (ADWR) reviewed, concurred and provided comments on the proposed ESD dated March 1993. Comments regarding this proposed ESD submitted to EPA by these two state of Arizona agencies are summarized below.

ADWR concurred with the proposed ESD and submitted the following three comments:

1) The beneficial use of treated groundwater (re-injection) is consistent with Arizona Revised Statues Title 45 (Pages 21-23). ADWR strongly encourages re-injection of treated water at Superfund sites. If there are any future changes in end use, the new end uses(s) must be consistent with state laws.

2) Pursuant to A.R.S. 45-454.01, no permit is required to withdraw groundwater in the case of re-injection. Because withdrawal of groundwater will take place within a Superfund site and because all water will be re-injected, no Poor Quality Groundwater Withdrawal Permit will be needed from ADWR. Again, if end use changes from re-injection, a permit may be required.

3) Any groundwater withdrawn by the City of Goodyear as "recovered" re-injected water (Page 23) will be considered to be withdrawn pursuant to the city's service area right and will count against the city's gallons per capita per day (GPCD).

ADEQ considered the proposed ESD to be an adequate document and submitted the following four comments:

1) ADEQ still recommends that EPA include a reference in the ESD to the phased groundwater remedy and the proposed Subunit B groundwater remedy for PGA-north.

2) ADEQ appreciates the fact that EPA has described the "trigger level" for ketone concentrations as 50% of the compounds' clean-up standards. ADEQ would, however, like the assurance that adequate testing will be conducted on the efficiency of the groundwater air stripping system, since liquid-phase granular activated carbon (GAC) may not be required.

3) Conditions 1-4 of Table 2 on page 15 of the ESD should be explained in the text of the ESD. Also, the system's destruction efficiency for acetone, methyl ethyl ketone, and trichloroethylene, as determined during the pilot testing period, should be provided in the table.

4) The ESD should state that "ppm" is an abbreviation for "parts per million" (also applicable to Table 1).

Comments numbers one and two from ADWR have been incorporated into this ESD. ADWR's comment number three required no action with respect to this ESD but is provided for informational purposes. All four of the above ADEQ comments have been addressed and incorporated in this ESD.

V. STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes made to the selected remedy upon implementation of this ESD, EPA believes that the remedy for the PGA site will remain protective of human health and the environment, will continue to comply with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and will continue to be cost-effective. In addition, the revised remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. One or more of the changes and clarifications contained in this ESD are significant, but none of the proposed changes fundamentally change the remedy.

VI. PUBLIC PARTICIPATION ACTIVITIES

EPA has presented these changes to the remedy in the form of

an ESD because the changes are of a significant but not fundamental nature. However, in order to promote public participation, EPA provided the public with a thirty (30) day comment period on a proposed ESD dated March 1993. In accordance with Section 117(c) of CERCLA, 42 U.S.C. Section 9617(c), EPA published in the West Valley View newspaper and the Arizona Republic newspaper a notice that describes the proposed ESD and identified the final due date for public comments as April 1, 1993. In order to collect additional public comment, EPA held a public meeting in the City of Avondale during the public comment period on March 10, 1993. EPA will again publish in the West Valley View and Arizona Republic newspapers a notice that describes this final ESD and announces its availability for review. In accordance with 40 C.F.R. Section 300.435(c)(2)(ii), this final ESD and all documents that support the changes and clarifications herein will be contained in the Administrative Record for the PGA site prior to the commencement of the remedial actions affected by the final ESD.

John Wise

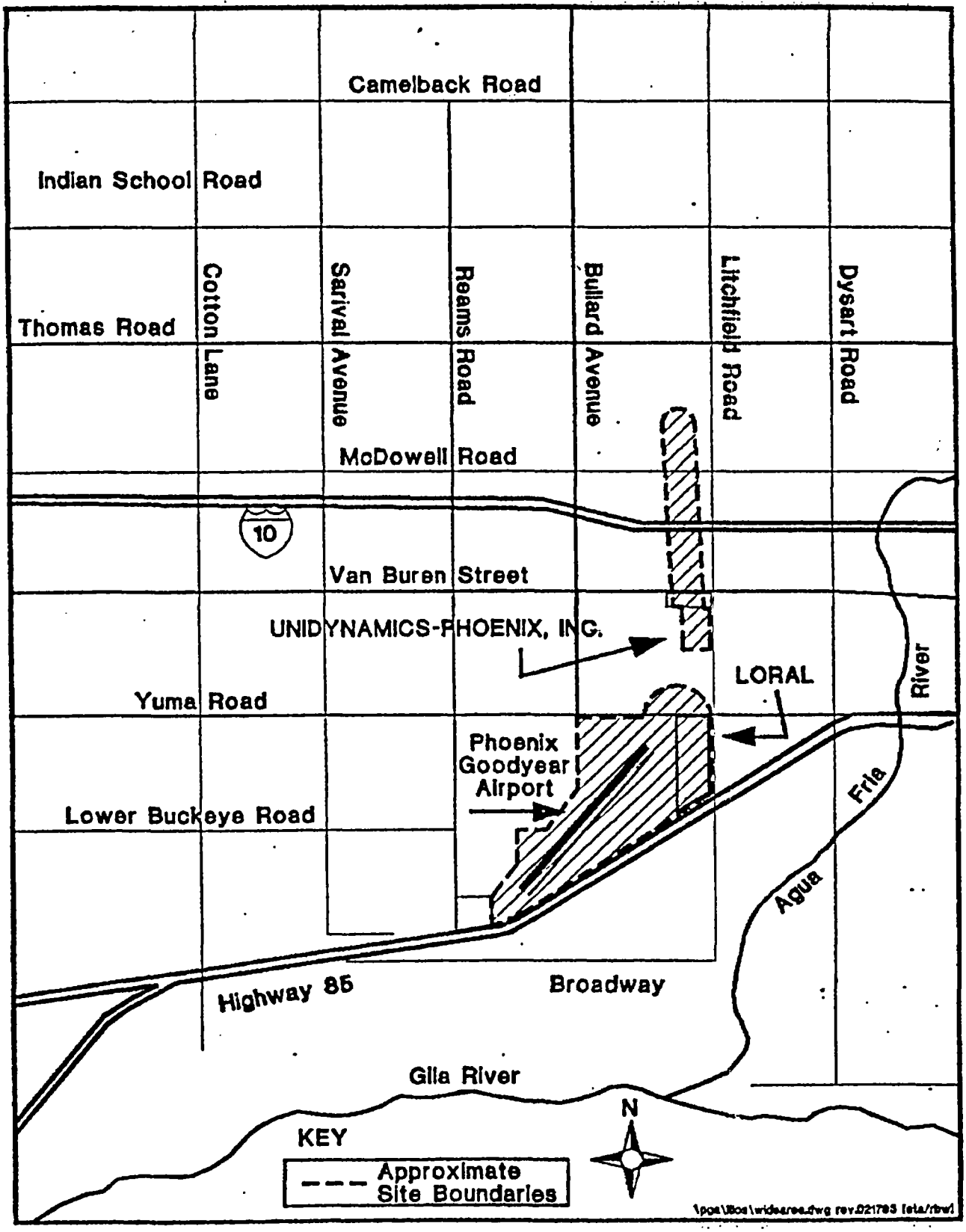
John Wise
Acting Regional Administrator

5.5.93

Date

ATTACHMENT #1

Approximate Boundaries of Phoenix Goodyear Airport Area Superfund Site



ATTACHMENT #2

Overview of the modifications made by Explanation of Significant Differences (ESD#2) to the Phoenix-Goodyear Airport (PGA) Area Superfund site September 1989 Record of Decision (ROD). See Attachment #3 for a listing of modifications to the groundwater clean-up standards at the PGA Superfund site.

The Original 1989 ROD Site Clean-up Plan	The Site Clean-up Plan as modified by ESD#2
Airport Area	Airport Area
- Soils: Soil vapor extraction with vapor-phase carbon emission controls.	- Soils: same as 1989 ROD.
- Deep Groundwater: Pump and treat at a centralized air stripping plant. Provide treated water to City of Goodyear.	- Deep Groundwater: Pump and treat at decentralized liquid-phase GAC treatment units and reinject treated water back into deep groundwater zone.
- Shallow Groundwater: Incorporatated 1987 Record of Decision requirement for pump and treat at a centralized air stripping plant with vapor-phase carbon emission controls. Reinject treated water.	- Shallow Groundwater: same as 1989 ROD.
Unidynamics Area	Unidynamics Area
- Soils: Soil vapor extraction with vapor-phase carbon emission controls.	- Soils: same as the 1989 ROD except treat extracted contaminant vapors by thermal oxidation and wet scrubbing.
- Deep Groundwater: Pump and treat at a centralized air stripping/liquid-phase carbon treatment plant with vapor-phase carbon emission controls. Provide treated water to City of Goodyear.	- Deep Groundwater: same as the 1989 ROD except reinject treated water back into deep groundwater zone.
- Shallow Groundwater: Pump and treat at a centralized air stripping/ liquid-phase carbon treatment plant with vapor-phase carbon emission controls. Reinject treated water.	- Shallow Groundwater: same as the 1989 ROD except suspend implementation of the liquid-phase carbon unit until warranted.
Additional Site-wide Requirements	Additional Site-Wide Requirements
- none.	- Liquid-phase carbon treatment at the well-head for drinking water wells contaminated by Airport or Unidynamics areas.
	- Add 4 new groundwater standards.

ATTACHMENT #3

A summary of the legally applicable state and federal requirements and other criteria for groundwater clean-up levels as reported in Table 2-5 of the September 1989 Record of Decision for Phoenix-Goodyear Airport Area Superfund Site including modifications established by the January 1991 Explanation of Significant Differences (1991 ESD) and modifications established by ESD#2.

All Concentrations are in micrograms per liter.

Compound	Cleanup Level
1,1-Dichloroethylene	7
1,2-Dichloropropane	1
Chloroform	100
Toluene	340
Trichloroethylene	5
Trichlorofluoromethane	1
Carbon Tetrachloride	5
Methylene Chloride	1
Methyl Ethyl Ketone *	350
Xylenes	440
Antimony	1.46
Arsenic	50
Barium	1,000
Beryllium	0.0039
Cadmium	10
Chromium	50
Lead	50
Mercury	2
Nickel	15.4
Selenium	10
Silver	50
Zinc	5,000
Acetone **	700
Benzene ***	5
Ethylbenzene ***	700
Tetrachloroethene ***	5
1,1,2,2-tetrachloroethane ***	0.18

* Revised groundwater cleanup level established by the 1991 ESD
** New groundwater cleanup level established by the 1991 ESD
*** New groundwater cleanup levels established by ESD#2

0217 - 00119

Attachment #4

PHOENIX-GOODYEAR AIRPORT AREA
Superfund Removal Site
EXPLANATION OF SIGNIFICANT DIFFERENCES
ADMINISTRATIVE RECORD INDEX
MAY 1993

DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
00/00/00	AR 1	M Chapman, D Field Scotts Graphics, Inc		Article: Lessons fr carbon bed adsorption losses
00/00/00	AR 2	A Naujokas Eastman Kodak Co		Article: Preventing carbon bed combustion problems
85/04/00	AR 3	A Naujokas Eastman Kodak Co		Article: Spontaneous combustion of carbon bed (Plant/Operations Progress, 4/85: 120-126)
90/03/00	AR 4	Joseph Tessitore, et al Cross/Tessitore & Associates		Article: Thermal destruction of organic air toxics (Pollution Engineering, 3/90: 58-68)
90/04/16	AR 5	Stephen Cleveland City of Goodyear, AZ	Craig Cooper Environmental Protection Agency - Region 9	City of Goodyear proposal for end use water & irrigation alternatives, w/appendix, oversized map, & TL fr S Cleveland to C Cooper (doc date fr TL)
92/02/07	AR 6	Daniel Herbert Malcolm Pirnie, Inc	Craig Cooper Environmental Protection Agency - Region 9	TL: Transmits technical articles referenced in Evaluation of Alternatives for Treatment of Extracted Soil Vapor during SVE Testing
92/02/07	AR 7	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Comments on 10/91 quarterly groundwater sampling rpt
92/02/11	AR 8	Daniel Hebert Malcolm Pirnie, Inc	William Donahue Unidynamics Phoenix, Inc	Ltr: Transmits description of work prepared for special sampling event 2/12/92 w/encl
92/02/13	AR 9	Moses Olade AZ Dept of Environmental Quality	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Transmits analytical results of groundwater samples fr Unidynamics special sampling event 2/92 w/encl & w/TL fr K DeWhitt to W Turner 3/3/92
92/03/03	AR 10	Daniel Hebert Malcolm Pirnie, Inc	William Donahue Unidynamics Phoenix, Inc	Ltr: Reports results of special groundwater sampling event conducted 2/12/91
92/03/09	AR 11	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Approves special sampling event for MW-4, MW-7 & MW-8 wells
92/03/13	AR 12	Malcolm Pirnie, Inc		Evaluation of alternatives for treatment

PHOENIX-GOODYEAR AIRPORT AREA
Superfund Removal Site
EXPLANATION OF SIGNIFICANT DIFFERENCES
ADMINISTRATIVE RECORD INDEX
MAY 1993

DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
				of extracted soil vapor during SVE (soil vapor extraction) pilot testing
92/04/07	AR 13	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Soil vapor extraction (SVE) pilot testing (US Amended Admin Order Docket #90-20)
92/04/07	AR 14	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Soil vapor extraction (SVE) pilot testing
92/04/20	AR 15	Bill Donahue Unidynamics Phoenix, Inc	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Proposed revision to test methods
92/06/00	AR 16	AZ Dept of Environmental Quality		Human health-based guidance levels for ingestion of contaminants in drinking water & soil
92/07/00	AR 17	Malcolm Pirnie, Inc		Health & safety plan: Soil vapor extraction (SVE) remedial design & operation activities (revised 7/31/91) w/TL fr D Hebert to C Cooper 7/30/92
92/07/08	AR 18	William Donahue Unidynamics Phoenix, Inc	Craig Cooper Environmental Protection Agency - Region 9	Monthly rpts for remedial activities for 5/92-7/92, dated 6/9/92 & 7/8/92 (Admin Order Docket #90-20)
92/07/21	AR 19	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Follow-up issues to 6/25/92 mtg including VLEACH rpt, SVE pilot program, & gw remedy
92/08/00	AR 20	Malcolm Pirnie, Inc		Soil vapor extraction (SVE) pilot testing program description & interim routine sampling program at Unidynamics w/TL fr W Donahue to C Cooper 8/31/92
92/08/11	AR 21	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Soil vapor extraction (SVE) pilot testing program
92/08/25	AR 22	Daniel Hebert Malcolm Pirnie, Inc	William Donahue Unidynamics Phoenix, Inc	Ltr: Transmits results fr re-sampling & analysis of MW-4, MW-7 & MW-8 wells w/encls & ltr fr J Harlan to C Gordon 8/19/92

PHOENIX-GOODYEAR AIRPORT AREA
Superfund Removal Site
EXPLANATION OF SIGNIFICANT DIFFERENCES
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DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
92/08/28	AR 23	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Soil vapor extraction (SVE) pilot testing prog (US Amended Admin Order Docket #90-20)
92/10/00	AR 24	Malcolm Pirnie, Inc	Environmental Protection Agency - Region 9	Final groundwater sampling rpt
92/11/03	AR 25	Byron James AZ Dept of Environmental Quality	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Transmits sampling & analysis of irrigation & drinking water supply wells at Park Shadows Apartments, Goodyear, AZ w/encls
92/11/10	AR 26	Daniel Hebert Malcolm Pirnie, Inc	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Transmits copy of revised soil vapor extraction (SVE) pilot testing program description w/encl
92/11/16	AR 27	Todd Struttman Sharp & Assoc	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Transmits revised conceptual (30%) design rpt for groundwater remedy, 2 oversize maps, & Goodyear comments on design rpt w/encls
92/11/24	AR 28	Craig Cooper Environmental Protection Agency - Region 9	William Donahue Unidynamics Phoenix, Inc	Ltr: Revised Soil vapor extraction (SVE) pilot testing program
93/02/00	AR 29	Malcolm Pirnie, Inc	Unidynamics Phoenix, Inc	Soil vapor extraction (SVE) pilot testing rpt
93/02/02	AR 30	Environmental Protection Agency - Region 9		Selected guidance documents, Explanation of Significant Differences (ESD), 3/92
93/02/17	AR 31	Lawrence Smith URS Consultants, Inc	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Transmits analytical data for City of Goodyear municipal wells & for Park Shadows Apartments wells w/encl (Cont #68-W9-5400, WA #54-12-9P19)
93/02/18	AR 32	Lawrence Smith URS Consultants, Inc	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Reviews groundwater remedy phase 1 design analysis & need for granular activated carbon polishing (GAC) (Cont #68-W9-0054, WA #54-12-9P19)
93/03/00	AR 33	Environmental Protection Agency - Region 9		Public notice of availability of proposed Explanation of Significant Differences (ESD) for cleanup of PGA Superfund Site

PHOENIX-GOODYEAR AIRPORT AREA
Superfund Removal Site
EXPLANATION OF SIGNIFICANT DIFFERENCES
ADMINISTRATIVE RECORD INDEX
MAY 1993

DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
93/03/00	AR 34	Craig Cooper Environmental Protection Agency - Region 9		Proposed Explanation of Significant Differences #2 for the Final Remedy Record of Decision

No. of Records: 34
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PHOENIX-GOODYEAR AIRPORT AREA
Superfund Removal Site
EXPLANATION OF SIGNIFICANT DIFFERENCES
ADMINISTRATIVE RECORD INDEX
SUPPLEMENT 1, MAY 1993

DATE yy/mm/dd	AR #	AUTHOR	ADDRESSEE	SUBJECT
93/03/10	AR 35	Environmental Protection Agency - Region 9		Public mtg re 3/93 Explanation of Significant Differences (ESD) (transcript)
93/03/16	AR 36	Mason Bolitho AZ Dept of Water Resources	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Comments on Explanation of Significant Differences (ESD)
93/03/19	AR 37	Bryon James AZ Dept of Environmental Quality	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Transmits comments on Explanation of Significant Differences (ESD) w/encl
93/03/31	AR 38	Stephen Cleveland City of Goodyear, AZ	Craig Cooper Environmental Protection Agency - Region 9	Ltr: Comments on Explanation of Significant Differences (ESD)
93/05/00	AR 39	Craig Cooper Environmental Protection Agency - Region 9		Explanation of Significant Differences #2 (ESD #2) for final remedy Record of Decision
93/05/00	AR 40	Environmental Protection Agency - Region 9		Public notice of availability of Explanation of Significant Differences (ESD) for cleanup of PGA Superfund Site

No. of Records: 6
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PHOENIX GOODYEAR AIRPORT SUPERFUND SITE
Goodyear, Arizona

EXPLANATION OF SIGNIFICANT DIFFERENCES #5

Explanation of Significant Differences to September 1989 Record of Decision and May 1993 Explanation of Significant Differences #2.

September 2002

I. INTRODUCTION

In 1989, the United States Environmental Protection Agency ("EPA") issued a Record of Decision ("ROD") selecting the final remedy for contamination at the Phoenix-Goodyear Airport ("PGA") North Superfund Site ("Site") in Goodyear, Arizona. This Explanation of Significant Differences ("ESD") reestablishes that the air emissions control mechanism for the soil gas remedy under the ROD as granular activated carbon ("GAC") for the northern portion of the PGA Site - PGA-North.[1] In 1993, EPA issued an ESD which altered the ROD's soil gas remedy for PGA-North from treatment of air emissions from the Soil Vapor Extraction ("SVE") system from GAC to treatment by thermal oxidation ("thermox"). The SVE system with thermox functioned for four years, but was shut off for reevaluation in 1998 and has not been restarted due to community concerns regarding potential dioxin emissions from the thermox treatment unit. Due to current Site conditions, including high levels of residual soil gas contamination and increased spread of Site groundwater contamination, this ESD returns the soil gas remedy to SVE using GAC.

[1] The soil gas remedy at the southern portion of the PGA Site was closed out in 1999. See Polygon 96/92/27A Closure Report: Phoenix Goodyear Airport South (1999). Accordingly, this ESD only applies to the PGA-North soil gas remedy.

Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended, and 40 C.F.R. Section 300.435(c)(2)(i) (55 Fed Reg. 8666, 8852 (March 8, 1980)), require EPA to publish an ESD when significant, but not fundamental, changes are being considered to a final remedy plan as described in a ROD. If changes to a ROD would fundamentally alter the scope, performance or cost of the selected remedy, a ROD amendment is required. 40 C.F.R. Section 300.435(c)(2)(ii). EPA is issuing this ESD to provide notice of modifications to the 1989 ROD and ESDs subsequent thereto which significantly, but do not fundamentally, affect the selected remedy. Because this ESD does not propose a fundamental change to the remedy in the 1989 ROD with respect to scope, performance or cost, no formal public comment period is required. 40 C.F.R. §300.435(c)(2)(i).

This ESD and supporting documentation will become part of the PGA Administrative Record. Copies of the Administrative Record for the PGA Site including this ESD have been placed at the following locations:

Avondale Public Library
328 West Western Avenue
Avondale, AZ 85323
(602) 932-9415

EPA Region 9 Superfund Records Center
95 Hawthorne Street - Suite 403S
San Francisco, California 94105
(415) 536-2000

If additional information becomes available, EPA will revise the Administrative Record to reflect such material.

EPA has made this ESD and supporting information available to the public through the Administrative Record and information repository for the PGA Site. Additionally, EPA is

publishing a notice in the Arizona Republic, the West Valley View, and Prensa Hispana that briefly summarizes the ESD and announces its availability for review. In accordance with 40 C.F.R. Section 300.515(h)(3), EPA has provided a fifteen day comment period for the State of Arizona. The State's comments on this ESD are summarized in Section IV of this document and are also included in the Administrative Record.

II BACKGROUND

The following provides a brief background of the PGA Site, the 1989 ROD and subsequent relevant ESDs. Because this ESD only pertains to PGA-North, the background will focus only on PGA-North contamination and cleanup.

A. Site Background and Description

The PGA site is located in Goodyear, Arizona, approximately seventeen miles west of Phoenix in the western part of the Salt River Valley. The PGA site was divided into a northern and southern portion when Site investigation determined that there were separate contaminant source areas.

PGA-North consists of the Unidynamics property, located at 102 S. Litchfield Road, and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from that property. Attachment 1 to this ESD provides a map indicating the approximate boundaries for the entire PGA Superfund site. Current land uses on and near the Site are agricultural, industrial, and residential.

Solvent contamination was first discovered in certain areas of the Site by the Arizona Department of Health Services ("ADHS") in 1981. During the following two years, EPA and ADHS sampled area wells, revealing trichloroethylene ("TCE") contamination in 18 agricultural,

private and City supply wells in the Goodyear area. Other hazardous substances found at PGA-North during initial investigation include acetone, methyl ethyl ketone ("MEK"), 1,1,1-trichloroethane ("TCA"), tetrachloroethylene (PCE), and other VOCs. EPA added the PGA site to the National Priorities List ("NPL") on September 8, 1983. (Federal Register, Vol. 48, No. 175, p. 40671 (originally listed as "Litchfield Airport Area Superfund Site")).

A single ROD was produced for both the northern and southern portions of the PGA site and was signed by the EPA Regional Administrator on September 26, 1989.[2] The selected remedy for PGA-North is a pump and treat system for groundwater contamination in the A and C Subunits and an SVE system with emissions controls for the vadose zone.[3] Remedial action at PGA-North is being carried out by Unidynamics-Phoenix, Inc., through its parent company Crane Corporation ("Crane Co."), under a 1990 Unilateral Administrative Order. EPA, with the assistance of Arizona Department of Environmental Quality ("ADEQ"), authorizes and oversees all cleanup activities at the Site.

B. Soil Gas Remedy at PGA-North

a. Soil Gas Remedy Selection

The remedy selected in the ROD for contaminated soil gas at PGA-North was implementation of an SVE system with vapor-phase GAC air emission controls in the contamination target areas. "Target areas" are those areas where VOCs were detected in soil

[2] Groundwater and soil contamination at the southern portion of the site was originally addressed through a ROD of the Section 16 Operable Unit, which was signed on September 29, 1987. The remedy selected in the Section 16 ROD was determined to be consistent with that designated for the entire site in the 1989 ROD.

[3] The ROD's designated remedy for PGA-South is treatment of Subunit B/C groundwater and operation of an SVE system with emissions control for the vadose zone. Remediation at PGA-South has been conducted by the Goodyear Tire and Rubber Company.

samples at levels higher than 1 microgram per liter (see Attachment 2). The ROD provides that the identified target areas may be expanded or reduced, as necessary, in order to remove 99 percent of the contaminants from the soil. Additionally, the ROD provides that, where SVE is not wholly effective, excavation and treatment of the soils may be required.

The cleanup standard for VOC contamination in Site soils, as identified in the ROD and ESD #2, is the removal of contaminants from Site soils "until EPA is convinced the levels remaining will not cause or contribute to groundwater contamination in excess of the cleanup standard for groundwater." The cleanup level for TCE at the Site is 5 micrograms per liter.

To determine the impact of soil contamination on groundwater, EPA utilizes modeling to determine the quantity of leachate from soil contamination impacting the groundwater. The modeling is based upon VOC vapor samples taken from soil vapor monitoring wells and conversion of those soil vapor concentrations to total soil concentrations. To determine leachate generation potential, EPA uses a VLEACH model, and the resultant groundwater impact from the leachate is modeled using Mixcell.

EPA has issued four prior ESDs altering the remedy selected in the ROD. Two of those ESDs are relevant to this ESD. In January 1991, ESD #1 identified the PGA-North soil contamination target areas and clarified that soil excavation was one of a number of potential remedial options, rather than the sole option, should the SVE remedy ultimately be unsuccessful. In May 1993, EPA modified the ROD again through an ESD #2, which changed the air emissions control from GAC to thermox with wet scrubbing.

b. Soil Gas Remedial Design

In 1991 and 1992, under EPA oversight, Unidynamics designed the soil gas remedy as

described in the ROD. In late 1991, Unidynamics installed two SVE extraction wells within the ROD-designated target areas. During testing for contaminant concentrations and pressure data, soil gas samples were collected that showed levels of TCE at an average level of 475 parts per million ("ppm"), acetone at an average level of 299 ppm, and MEK at an average level of 1477 ppm. Based on the high level of contaminants found in these initial tests, estimates revealed that 4,000 pounds per day of GAC would be required to treat the air emissions from the SVE system. The high quantities caused Unidynamics concern regarding the overall cost of the remedy and the safety of transport of the potentially combustible GAC from the system for disposal. Additional concerns were raised regarding potential spontaneous combustion of the GAC canisters when used for treatment of the MEK and acetone that were detected in the soils. Accordingly, Unidynamics evaluated several SVE emissions control technologies, the results of which were contained in Evaluation of Alternatives for Treatment of Extracted Soil Vapor During SVE Pilot Testing (March 13, 1992).

In December 1992, EPA approved a pilot test of thermox of the SVE by-products with wet scrubbing. At that time, thermox was considered a demonstrated technology for treatment of soil contaminated with VOCs with a 99% destruction efficiency. Thermox eliminated the need to dispose of and regenerate large volumes GAC canisters, thereby reducing the cost of disposal and eliminating potential hazards inherent in transporting hazardous waste. After pilot testing in May 1993, EPA approved the use of thermox with a wet scrubber unit as vapor treatment for the SVE system, and documented that decision in ESD #2.[4]

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[4] PGA-South established an SVE system with air sparging at three different locations between March 1996 and April 1998. In April 1998, it was determined that soil remediation goals had been reached. This determination was confirmed with soil vapor rebound monitoring

c. Implementation of Soil Gas Remedy at PGA-North

Pursuant to ESD #2, Unidynamics constructed an SVE system utilizing thermox with wet scrubbing for emissions control. The SVE system was completed in 1994 and operated for approximately four years. During that time, the SVE system removed approximately 10,000 pounds of VOCs from the soils. However, from 1995 to 1998, the thermox treatment unit experienced numerous technical difficulties, including overheating, which required a number of system shut-downs. The entire SVE system was shut down for overall reevaluation in November 1998.

Following the shutdown of the thermox system, community concerns were raised regarding potential dioxin emissions from using a thermox unit to treat SVE emissions. The community expressed concern regarding the dioxin emissions and what was perceived as a lack of community notification regarding the treatment technology.

Due to these concerns, in March 2000, EPA briefed the City of Goodyear ("City") regarding the option of restarting the SVE system utilizing GAC instead of thermox. The City reiterated community opposition to the use of thermox, and requested, should EPA restart the SVE system, that all test results be provided to the public prior to full-scale system startup. In September 2001, EPA notified the City explaining that EPA would direct the restart of the SVE system with GAC in order to protect the groundwater from further contamination. On September

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from April through July 1998, and by final closure sampling in September of that year. During its operation, PGA-South's SVE system removed 1,768 pounds of chlorinated solvents, including TCE, from the area. (For details, see Polygon 96/92/27A Closure Report: Phoenix Goodyear Airport South (1999)). Closure was granted at PGA-South for the SVE remedy after monitoring values were inserted into the VLEACH and Mixcell models to determine that groundwater impact from soil contamination was less than five micrograms per liter.

25, 2001, the City of Goodyear indicated its support for the SVE system provided that adequate background evaluations were conducted.

During June 2002, EPA collected soil gas samples from the six multi-tier soil vapor monitoring probes adjacent to the SVE wells on the Unidynamics property. The testing detected high concentrations of TCE in all six probes, PCE in one probe, and no MEK or acetone in any probes (above the detection limit of 1 ug/l (microgram per liter). The maximum concentrations in parts per million by volume (ppmv) detected for TCE and PCE are shown in the table below.

Maximum Concentrations in Soil Vapor Monitor Wells - PGA North - June 2002

Monitor well	TCE (ppmv)	PCE (ppmv)	MEK (ppmv)	Acetone (ppmv)
SVM-1	1,200	19	ND	ND
SVM-2	580	ND	ND	ND
SVM-3	200	ND	ND	ND
SVM-4	350	ND	ND	ND
SVM-5	110	ND	ND	ND
SVM-6	540	ND	ND	ND

Further analysis has confirmed that VOC contaminant concentrations in the soils are high enough to continue to pose a considerable threat to groundwater requiring continued remedial action at the Unidynamics property. A more detailed chart comparing the TCE concentrations detected during 1996, 1997, and 2002 at various depths in each of the six soil vapor monitoring probes is depicted on Attachment 3.

III. DESCRIPTION OF ESD #5

This ESD returns the soil gas remedy for PGA-North to an SVE system utilizing GAC for

emissions control as originally chosen in the 1989 ROD. Although in June 2002 no ketones were detected above the detection limits, as a conservative measure, the GAC treatment unit will be designed with a fire protection system which will be activated based on carbon dioxide and/or carbon monoxide monitoring in case ketones are captured by the SVE system. The cost to restructure the SVE system for GAC emissions control will likely be less than to revitalize the current thermox system.

GAC is a proven technology for capturing air emissions from SVE systems, with an efficiency rate of near 100%, it is capable of removing TCE to below air emission limits. It is also approved as BACT (Best Available Control Technology) by the Maricopa County Air Pollution Board (APB). Additionally, utilization of a GAC system allays community concerns regarding dioxin emissions from the thermox system.

EPA anticipates that, based on the use of GAC, the remedy will cost approximately $40,000 for system reconfiguration (with a leased vendor-supplied GAC unit) and, at a minimum, $170,000 (including cost of carbon) annually for system operation and maintenance (O&M). To rehabilitate the thermox system would cost, at a minimum, $75,000 and annual O&M costs would run, at a minimum, $50,000 (assuming the thermox system were operated similarly to its operation during the 1990s).

The annual O&M costs for the GAC unit are estimated to be higher to operate than the O&M costs for thermox due to the collection of VOCs in spent carbon canisters which must be disposed [5] or regenerated at an EPA-approved treatment, storage and disposal facility. [5]

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[5] Due to the inability to predict the approximate mass of contaminant in the vadose zone beneath the Unidynamics facility, GAC consumption was calculated using historical influent TCE concentrations collected during operation of the thermox system. As a result, and based on

However, the annual O&M costs for thermox treatment could be underestimated for the following reasons: (1) the price has increased for propane or natural gas, which is needed to burn the contaminated gas vapors; (2) the projected flow rate of 150 cubic feet per minute (cfm) is higher than the actual flow rate when the thermox treatment unit was operating; and (3) the sampling and monitoring costs could be higher because of the public scrutiny and concern about potential formation of dioxin in the gas emissions from incomplete combustion of the gases.

Issues raised in the 1993 ESD #2 regarding disposal of large quantities of carbon are no longer relevant because the prior carbon usage estimates of 4,000 pounds per day of carbon were based on worst-case soil gas concentrations, prior to initiating the 1992 SVE pilot study. Current 2002 estimates for carbon usage are in the range of 100 pounds per day, and worst-case estimates are not more than 250 pounds per day, even were the SVE extraction system to be significantly expanded or the flow to be greatly increased.

The SVE system with GAC emissions will be operated until the VLEACH test indicates the soil gas is no longer impacting the groundwater above cleanup standards. With the present quantity of contaminants detected in the soil gas, it is expected that the system will operate at a minimum for one year. However, because there was insufficient collection of soil vapor monitor probe data and operational data during the period the thermox treatment unit was operating, the actual time needed to remove sufficient VOCs to meet the VLEACH test requirements is unknown.

Because the remedy merely returns to the original soil gas remedy in the 1989 ROD in

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recent soil gas sampling data, costs associated with annual O&M of a GAC unit may be significantly higher than what is presented.

order to meet the original cleanup standards, this ESD does not present a fundamental change in the performance or scope of the remedy.

IV. SUPPORT AGENCY COMMENTS

As required by 40 C.F.R. §300.515(h)(3), EPA has provided ADEQ an opportunity to review and comment on these changes to the 1989 ROD and 1993 ESD. ADEQ supports EPA issuing this ESD. Furthermore, due to public concern regarding dioxin emissions from the thermox system, EPA has provided the City of Goodyear with an opportunity to review and comment on the changes, and the City supports the changes as well.

V. STATUTORY DETERMINATIONS

Where a remedial action is being taken that differs significantly from that determined in a ROD, but does not fundamentally alter the chosen remedy in scope, performance or cost, the lead agency must consult with support agencies and produce and publicize an ESD explaining the changes. This ESD does affect the form and cost of the current soil gas remedy for PGA-North, but it does not fundamentally alter the scope, performance or cost of the remedy.

This ESD returns the soil gas remedy to that selected in the ROD from the alterations made by ESD #2, but the remedy remains otherwise unchanged. This remedy is protective of human health and the environment. The change does affect the scope and performance of the remedy as last articulated, and thus it is significant. This ESD does not, however, fundamentally alter the remedy selected in the ROD with respect to scope, performance or cost.

VI. PUBLIC PARTICIPATION ACTIVITIES

Pursuant to 40 C.F.R. §300.435(c)(2)(i), a formal public comment period is not required for an ESD to a ROD when the difference does not fundamentally alter the remedy selected in the

ROD with respect to scope, performance or cost. This ESD does not propose a fundamental change to the remedy in the ROD with respect to scope, performance or cost, and therefore, no formal public comment period is required. EPA has made this ESD and supporting information available to the public through the Administrative Record and information repository for the PGA Site. Additionally, due to public interest, EPA has participated in Community Advisory Group (CAG) meetings and published several fact sheets intended for the public to learn about the changes set forth in this ESD. EPA is publishing a notice in the Arizona Republic, the West Valley View, and the Prensa Hispana that briefly summarizes the ESD, including the reasons for such differences, and that announces its availability for review.

Deborah Jordan
Branch Chief, Superfund Division
EPA Region 9

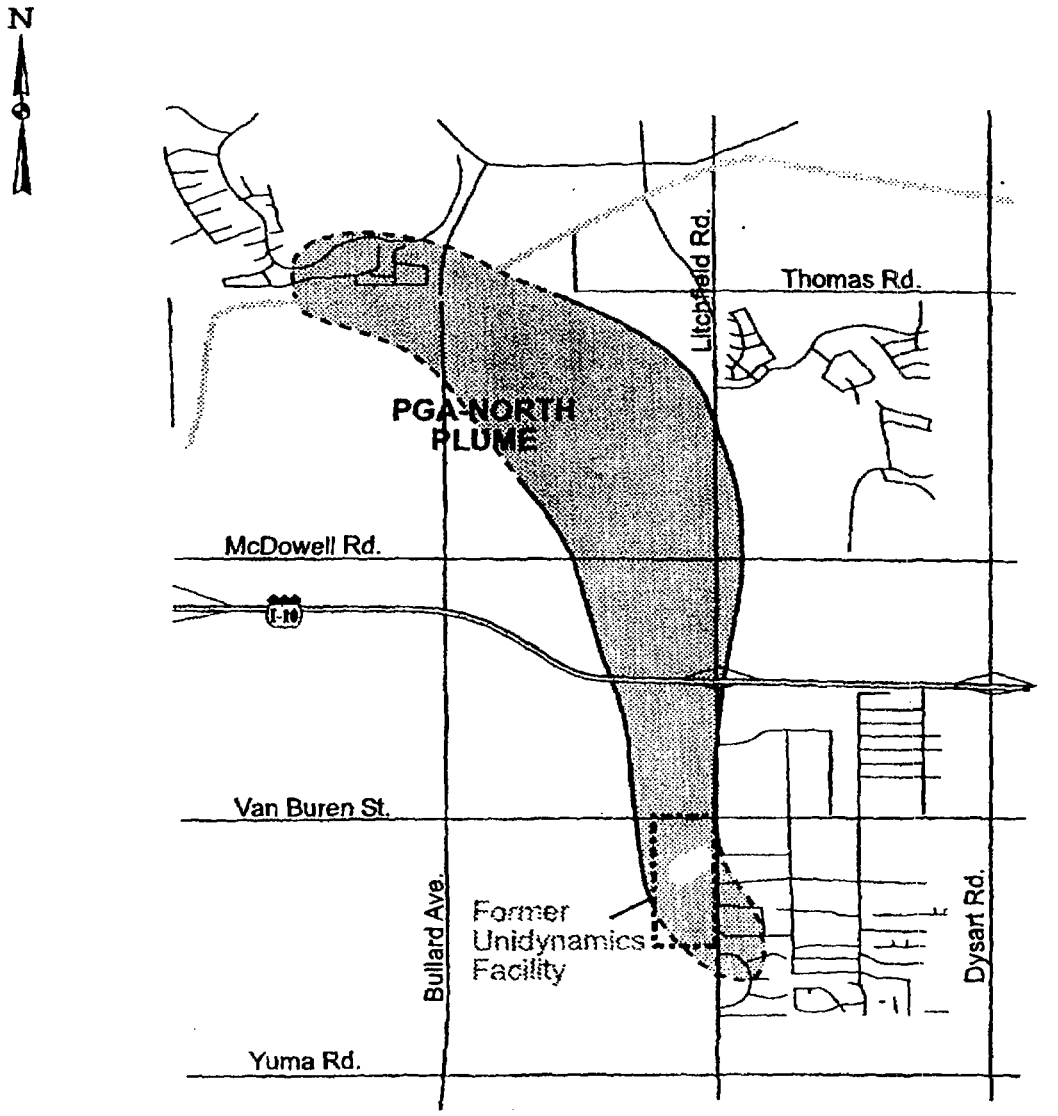
9-19-02
Date

Attachments:
1. Map Showing Location of PGA North Superfund Site
2. Map Showing VOC Target Areas Identified in ROD
3. Summary of TCE Soil Vapor Well Monitor Results for 1996, 1997 and 2002

Attachment 3

Summary of TCE Soil Vapor Monitor Well Results
Phoenix, Goodyear Airport, Unidynamics Facility

VMW Location Depth	TCE (ug/L) Nov 1996	TCE (ug/L) Dec 1997	TCE (ug/L) June 2002
SVM-1-10	19	0.8	32
SVM-1-20	5.2	1.1	140
SVM-1-30	23	110	690
SVM-1-40	1200	4300	2400
SVM-1-50	1600	4100	6400
SVM-2-10	5	1.1	41
SVM-2-20	1.7	0.6	160
SVM-2-30	480	24	980
SVM-2-40	1500	4500	3100
SVM-2-50	1800	3900	370
SVM-3-10	450	5	67
SVM-3-20	250	2.6	170
SVM-3-30	160	22	370
SVM-3-40	1300	3200	1100
SVM-3-50	3600	3600	1400
SVM-4-27.5	410	280	210
SVM-4-43	660	2000	590
SVM-4-53	800	1900	820
SVM-4-60	880	2800	920
SVM-4-74	1100	3100	1900
SVM-5-27.5	75	2.6	140
SVM-5-43	720	190	300
SVM-5-53	780	230	590
SVM-5-60	710	250	570
SVM-5-74	560	24	440
SVM-6-27.5	5.2	71	10
SVM-6-43	110	2100	21
SVM-6-53	240	2700	29
SVM-6-60	260	2300	32
SVM-6-74	250	2600	23



0 0.5 1

Scale in Miles

LEGEND

Area of known soil contamination

Estimated extent of groundwater contamination, exceeding the maximum contaminant level for TCE (5µg/L) dashed where inferred (approx. 70-130 feet underground)

EPA does not consider surface areas above the contaminated groundwater that are outside of the source area and that are not used for remediation activities as part of the Superfund site.

FIGURE 1
NORTHERN AREA OF PGA SUPERFUND SITE
PHOENIX GOODYEAR AIRPORT SUPERFUND SITE

PHX1324_02 FH8 (05/08/01)

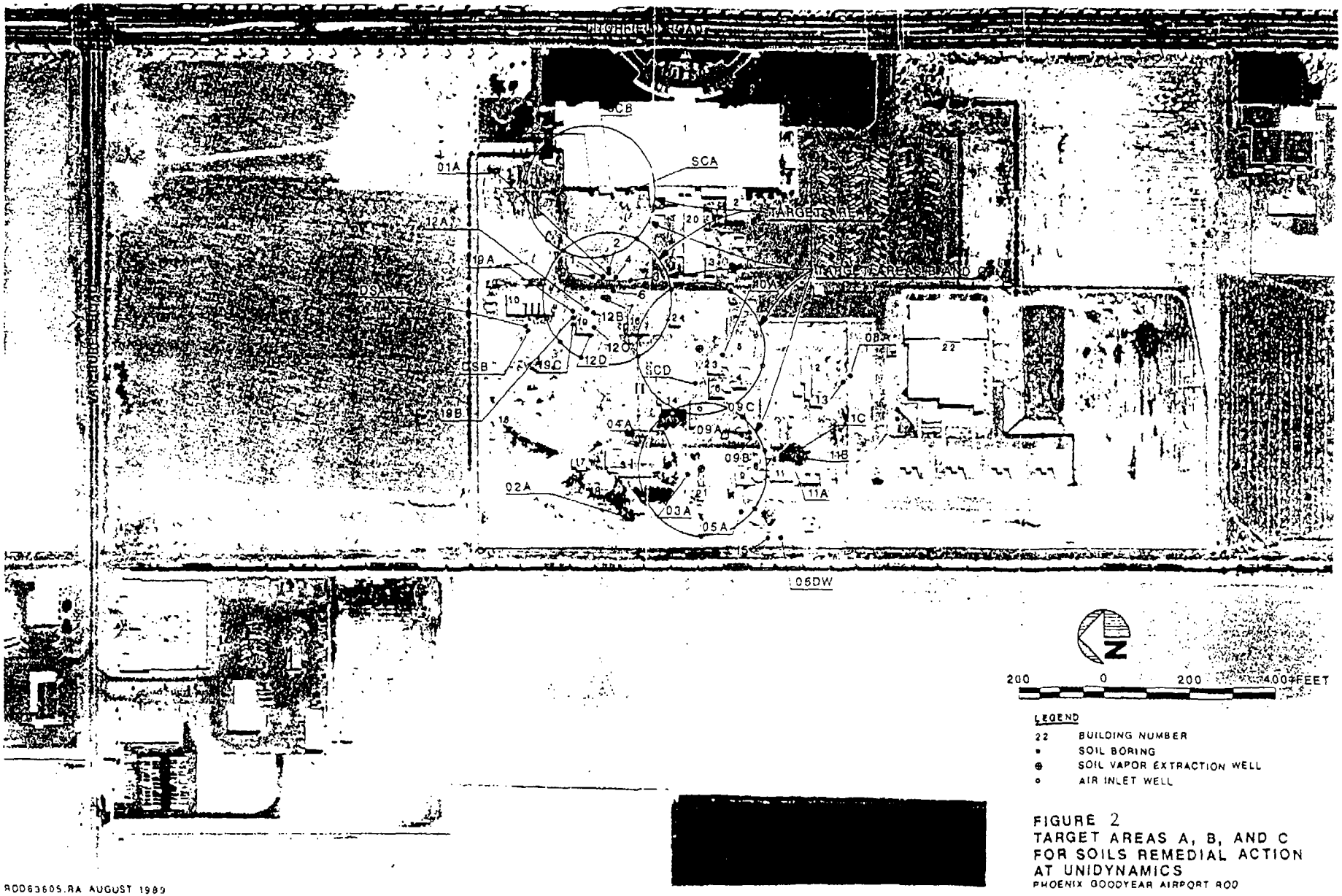


FIGURE 2
TARGET AREAS A, B, AND C
FOR SOILS REMEDIAL ACTION
AT UNIDYNAMICS
PHOENIX GOODYEAR AIRPORT ROD

RD063605.RA AUGUST 1989

APPENDIX C

Appendix C
Scope of Work
U.S. v. Crane/Unidynamics Consent Decree
Phoenix-Goodyear Airport North Superfund Site
Groundwater, Soil Gas, Air, Soils, and Facility Structures Remedy
Supplemental Remedial Investigation and Feasibility Study,
and Remedial Design, and Continued Remedial Action

Table of Contents

Glossary of Acronyms

1989 ROD - 1989 Record of Decision
1998 O&M Plan - 1998 Operation and Maintenance Plan
ADEQ - Arizona Department of Environmental Quality
ADWR - Arizona Department of Resources
ARARs - Applicable or Relevant and Appropriate Requirements
CHASP - Construction Health and Safety Plan
CLP - Contract Lab Program
COCs - contaminants of concern
CQAP - Construction Quality Assurance Plan
CQAPP - Construction Quality Assurance Project Plan
DNAPL - Dense Non-Aqueous Phase Liquids
ESDs - Explanation of Significant Differences
FSAP - Field Sampling & Analysis Plan
GAC - Granulated Activated Carbon
GWWTP - Goodyear's Wastewater Treatment Plant
HASP - Health and Safety Plan
HEAs - Health Effects Assessment documents
HEAST - Health Effects Assessment Summary Tables
IRIS - Integrated Risk Information System
MAU - Middle Alluvial Unit
NCP - National Contingency Plan
NELAP - National Environmental Laboratory Accreditation Program
O&F - Operational and Functional
O&M - Operation & Maintenance
O&M Plan - Operation and Maintenance Plan
PGA - Phoenix-Goodyear Airport
PRGs - Preliminary Remediation Goals
QA - Quality Assurance
QAPP - Quality Assurance Project Plan
QA/QC - Quality Assurance/Quality Control
QA/R-2 - Quality Management Plans
OSHA - Occupational Safety and Health Administration
RA - Remedial Action
RAA - Risk Assessment Amendment
RAO - Remedial Action Objective

RfDs - Reference Doses
RI/FS - Remedial Investigation/Feasibility Study
SCM - Site Conceptual Model
SFS - Supplemental Feasibility Study
SOW - Scope of Work
SRD - Supplemental remedial design
SVE - Soil Vapor Extraction
SVM - Soil Vapor Monitor
SWMUs - Solid Waste Management Units
UAU - Upper Alluvial Unit
VI Guidance - Vapor Intrusion to Indoor Air Pathway from Groundwater & Soils
VOC - Volatile Organic Compound

------APPENDIX C-------

GROUNDWATER, SOIL GAS, AIR, SOILS, AND FACILITY STRUCTURES REMEDY SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY, REMEDIAL DESIGN, AND CONTINUED REMEDIAL ACTION SCOPE OF WORK

Phoenix-Goodyear Airport North Superfund Site
Goodyear, Arizona

PURPOSE OF SOW

This Scope of Work ("SOW") is Appendix C to, and incorporated as part of, the Consent Decree ("CD") between the United States and Unidynamics/Phoenix, Inc., and Crane Co. ("Settling Defendants") in the matter captioned *United States v. Unidynamics/Phoenix, Inc. et al.*, No. CV-04-1400-PHX-JAT, regarding the release of hazardous substances at the Phoenix-Goodyear Airport (North) Superfund Site ("PGA-North" or "Site"). The purpose of this SOW is to complete the investigation, including treatability studies, and the remedial design, and construction, maintenance, operation and evaluation of removal and remedial action response activities for the following Site components:

- Groundwater
- Soil Gas
- Air
- Soils (surface and subsurface)
- Facility Structures

In designing, implementing, and submitting deliverables for the ongoing response action at the Site, Settling Defendants shall follow this SOW, the appropriate U.S. Environmental Protection Agency ("EPA") Superfund Guidance for Remedial Investigations and Feasibility Studies, Remedial Design, and Remedial Action, the September 1989 Record of Decision and subsequent

Explanations of Significant Differences (collectively referred to herein as the "ROD"), all approved Investigation Workplans, all approved Remedial Design and Remedial Action Workplans, all approved Operation and Maintenance Plans, all additional approved plans, any additional guidance provided by EPA, and the provisions of the CD.

GENERAL PROVISIONS

Definitions

The definitions set forth in the CD are incorporated herein by reference and shall apply to this SOW unless expressly provided otherwise herein.

EPA Approval of Workplans and Other Deliverables

Where Settling Defendants are required to submit a workplan or other deliverable to EPA for review and approval, EPA will either approve, disapprove, or require modification(s) to the submission in accordance with the procedures set forth in Section XI (EPA Approval of Plans and Other Submissions) of the CD. The Arizona Department of Environmental Quality ("ADEQ") shall also have a reasonable opportunity to review and comment on workplans or other deliverables submitted pursuant to this SOW. Settling Defendants acknowledge and agree that nothing in this SOW or any approved plans or deliverables constitutes a warranty or representation of any kind by the United States that compliance with the work requirements set forth in this SOW or any approved plans or deliverables will achieve the Site Performance Standards. Nothing in this SOW or any approved plans or deliverables shall be construed to limit any authority of the United States to take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or to require performance of further response actions as otherwise provided in the CD.

Notification and Reporting of Field Support Activities:

Settling Defendants shall notify EPA at least fifteen (15) days in advance of any field support activities in order to allow EPA to provide oversight of those activities. Field support activities include, but are not be limited to, obtaining access to private and public properties where investigative activities are to be conducted, scheduling activities, and procurement of field equipment, laboratory services, and contractors.

Each workplan submitted pursuant to this SOW shall list all permits, property, leases, and easements required for implementation of the investigation or response activity and a schedule for submittal of permit applications and acquisition of property leases or easements. Where normally required, permits must be obtained for all off-site activities. Settling Defendants are not required to obtain permits for on-site remedial activities, but must comply with all substantive requirements, including local building codes. Where permits will not be obtained for an on-site activity where a permit is normally required, Settling Defendants shall describe all consultative or coordination activities planned to identify and satisfy the substantive requirements. The status of permitting issues will be updated monthly in the monthly progress reports.

Where applicable, workplans shall describe the roles and responsibilities of all other parties expected to play a significant role in the design, construction, or operation of the remedial action. The workplan shall summarize and provide copies of memoranda of understanding and draft or final agreements with water purveyors and other third parties expected to participate in implementation of the remedial action. If legally-binding agreements are not in place, the workplan shall describe commitments made to date and planned efforts to secure necessary commitments, including an estimated schedule. If the participation of a third party is uncertain, the workplan shall describe alternatives to be implemented in the event that the party does not

fulfill its planned role. Possible third party roles include agreeing to the use of existing equipment (*e.g.*, groundwater extraction wells, groundwater monitor wells, water treatment facilities, pipelines, groundwater recharge facilities, power supplies), treatment plant operation, and acceptance of treated groundwater.

GROUNDWATER

The purpose of the groundwater component of this SOW is to conduct activities related to the investigation, removal, and remediation of contaminated groundwater in Subunits A, B and C (collectively known as the Upper Alluvial Unit ("UAU")), and related to the investigation of and, if appropriate, removal and remediation of contaminated groundwater in the Middle Alluvial Unit ("MAU") at the Site.

The activities outlined under Tasks 2.0 - 6.0 and 10.0 shall be conducted concurrent with the ongoing operation and maintenance ("O&M") of the existing groundwater remedy as set forth in Task 1.0 pursuant to the ROD. As described under Task 1.0, Settling Defendants shall update the existing Operation and Maintenance Plan ("O&M Plan") (Task 1.1), as needed, to ensure that the plan is current and meets the operation and maintenance requirements of this SOW (Task 14.6).

The activities under Tasks 2.0 - 6.0 and 10.0 include investigation to identify other Site potential contaminants of concern ("COCs"), to identify potential sources of groundwater contamination and contaminant migration pathways, to determine the vertical and lateral extent of groundwater contamination, and to develop and/or update a groundwater flow model and a contaminant fate and transport model, the conduct of treatability studies to evaluate alternatives to remove COCs not currently addressed in the ROD, such as perchlorate, enhancement of the existing groundwater remedy, and development of a Supplemental Feasibility Study ("SFS") for any potential fundamental changes to the present groundwater remedy. Should EPA determine

that a fundamental change to the existing groundwater remedy is necessary, Settling Defendants shall perform the modified remedy consistent with the CD and in accordance with the requirements of Task 13.0 (Supplemental Remedial Design) and Task 14.0 (Remedial Actions) of this SOW.

Task 1.0 Operation and Maintenance of Existing Groundwater Remedy

The objectives of Task 1.0 are to:

- update the O&M Plan for the existing groundwater remedy;
- continue treatment of Site COCs with the current extraction and treatment systems;
- operate and maintain current extraction and treatment systems and monitoring well network; and
- make adjustments to the remedy as necessary to address findings made during the Groundwater Investigation (Task 2.0), the Main Drywells Area Investigation (Task 5.0), and the Source Areas, Soils and Facility Structures Investigation (Task 10.0).

Task 1.1 Operation and Maintenance Plan

Settling Defendants shall update the *Groundwater and Soil Remediation Operation and Maintenance Plan for Unidynamics/Phoenix, Inc. Phoenix-Goodyear Airport (PGA) Superfund Site (North)* (Malcolm Pirnie, Inc., March 1998) ("1998 O&M Plan") to meet the requirements of this SOW and to reflect any modifications to the ongoing O&M of the existing groundwater remedy that are not described in the 1998 O&M Plan. The updated O&M Plan for the existing groundwater treatment plants, the groundwater extraction well network, and the groundwater monitoring well network shall be developed in accordance with Task 14.6 of this SOW.

Settling Defendants shall submit to EPA for review and approval an updated O&M Plan by December 1, 2004. Unless otherwise directed by EPA, O&M of the groundwater remedy shall continue in accordance with the applicable sections of the 1998 O&M Plan until

development and EPA approval of the updated O&M Plan. EPA may also request periodic updates of the O&M Plan as more information is gathered, as conditions change during investigation and remedial action, and/or as the groundwater treatment system is modified. Should EPA make a written determination that an update of the O&M Plan is warranted, Settling Defendants shall submit an updated O&M Plan within forty-five (45) days of EPA's determination.

Task 1.2 Operation and Maintenance Reporting

Settling Defendants shall submit an Annual O&M Report describing all engineering O&M activities for that calendar year, including, but not limited to, a summary of equipment-related maintenance, carbon replacement, a summary of air quality monitoring in the treatment plant areas and of the granular activated carbon ("GAC") contactor vessels, and a summary of any structural changes to the extraction or monitor well network.

Should any significant repairs or deviations from the applicable O&M Plan be required, such as repair activities that cause extraction wells or any treatment facility to be offline for more than twenty-four (24) hours, Settling Defendants shall notify EPA within forty-eight (48) hours either through correspondence or through a telephone call followed by written confirmation no later than five (5) days after the repair or deviation.

Should any action or occurrence during performance of activities pursuant to this SOW cause an actual release or threaten a release of hazardous waste that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Settling Defendants shall immediately notify the EPA Region 9 Duty Officer, Regional Response Center, at (800) 300-2193 (24-hour line) and the Site Remedial Project Manager ("RPM"). In addition, in the event of any actual release of a hazardous substance from the Site, Settling Defendants shall immediately notify the National Response Center at (800) 424-8802. In the

event of a spill of untreated Site groundwater, in an amount over five (5) gallons, Settling Defendants shall notify the Site RPM within forty-eight (48) hours. In each of these circumstances, Settling Defendants shall submit a written report to EPA within seven (7) days of any release setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release.

Task 1.3 Operation and Maintenance of the Existing Groundwater Remedy

Settling Defendants shall operate and maintain the existing groundwater extraction and treatment remedy and monitoring system as set forth in the current remedial design documents and the applicable sections of the 1998 O&M Plan, or any updated O&M Plan developed pursuant to Task 1.1, until otherwise directed by EPA.

Summary of Task 1.0 Deliverables and Schedule

• Draft Groundwater O&M Plan	12/1/04
• Final Groundwater O&M Plan	30 days after receipt of EPA comments
• Revised Groundwater O&M Plan	45 days after EPA determination
• Annual O&M Report	90 days after end of calendar year

Task 2.0: Groundwater Investigation

The objectives of Task 2.0 are to:

- identify the Site COCs in groundwater;
- define the vertical and lateral extent of Site contamination, including but not limited to TCE and perchlorate, in the UAU and in the MAU;
- characterize the aquifer properties of the UAU and the MAU by a program of drilling and soil analyses, well installation, geophysical testing and aquifer testing to measure the hydraulic connection between Subunits A, B, and C of the UAU and the MAU throughout

the known extent of contamination;

- characterize the contaminant pathways from the Source Areas to deeper aquifers;
- develop and regularly update Site three-dimensional groundwater flow model and contaminant fate and transport model;
- determine the ability of the current remedial system to contain the vertical and lateral extent of contamination in the UAU, and, where applicable, in the MAU; and
- identify and properly abandon potential conduit wells.

Task 2.1 Review Existing Groundwater Information

Settling Defendants shall review all existing information, including EPA's Phase II Source Area Groundwater Investigation ("Phase II") Report, regarding the distribution of contamination in the UAU (Subunits A, B, and C), and in the MAU, update the Site Conceptual Model ("SCM") accordingly, and identify data needed to define the extent of contamination in groundwater and to develop a comprehensive model of the flow and transport of contaminants in and between the UAU and the MAU. The review and data gap identification shall include, but not be limited to, the data and information on hydrogeology of the Site, the well inventory for the Site, potential conduit wells, potential COCs, potential sources of contamination, potential Dense Non-Aqueous Phase Liquids ("DNAPL"), and other factors that may impact groundwater characterization and groundwater quality that need to be identified for investigation in the Groundwater Investigation Workplan (Task 2.2).

Task 2.2 Groundwater Investigation Workplan

Settling Defendants shall develop a Groundwater Investigation Workplan that includes, but is not limited to, identification of the project team, the updated SCM (Task 2.1), description of the groundwater models that will be used to model groundwater flow and to model contaminant fate and transport, description of data gaps to identify COCs and to characterize the vertical and lateral extent of groundwater contamination, description of other data requirements to support the

groundwater models, description of the groundwater investigation data quality objectives ("DQOs"), overview of groundwater investigation strategy, description of the tasks associated with performing the groundwater investigation including a detailed well installation plan, and a schedule for performing the investigation.

The Groundwater Investigation Workplan shall include tasks and activities to meet the following objectives:

- Identify the full range of COCs in groundwater by sampling and analyzing groundwater in existing wells for compounds that may be present, such as 1,4-dioxane and radionuclides, and for explosives, including nitro aromatics, trinitrotoluene (TNT), RDX (2,3,5-trinitro-1,3,5-triazine) and HMX (oxyhydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine). Contaminants that are detected above defined background concentrations or EPA Region IX Preliminary Remediation Goals ("PRGs") shall be considered as Site COCs and further characterized accordingly.
- Determine the vertical and lateral extent of contamination in the vicinity of COG-02, and identify the preferential pathway for contamination in COG-02, by installing temporary boreholes to conduct geophysical, geotechnical, and depth-specific sampling.
- Determine the vertical and lateral extent of contamination to the east and southeast of the Unidynamics facility and to the east of Litchfield Road through geophysical, geotechnical, and depth-specific sampling. Gather sufficient data to install additional monitor wells to characterize the extent of groundwater contamination and extraction wells, if determined necessary, for plume capture and/or groundwater cleanup.
- Determine the vertical and lateral extent of contamination at the southern end of the Unidynamics facility and to the south and southwest through geophysical, geotechnical and depth-specific sampling. Gather sufficient data to install additional monitor wells to characterize the extent of groundwater contamination and to confirm whether a groundwater divide exists in Subunit A near Yuma Road, and extraction wells, if

determined necessary, for plume capture and/or groundwater cleanup.

- Determine the vertical and lateral extent of contamination at the west and northwest of the Unidynamics property in the direction of the Southern Pacific railroad tracks through geophysical, geotechnical, and depth-specific sampling. Gather sufficient data to identify contaminant sources, characterize potential preferential pathways initially identified in the Phase II Report, and to install additional monitor wells to characterize the extent of groundwater contamination and extraction wells, if determined necessary, for plume capture and/or groundwater cleanup.
- Determine the vertical and lateral extent of contamination at the north, northwest and northeast of Litchfield Road and Van Buren Street through geophysical, geotechnical, and depth-specific sampling. Gather sufficient data to identify contaminant sources, to identify and characterize potential pathways (such as transmissive intervals in Subunits B and C identified in the Phase II Report), and to install additional monitor wells to characterize the extent of groundwater contamination and extraction wells, if determined necessary, for plume capture and/or groundwater cleanup.
- Determine the vertical and lateral extent of potential contamination to the north-northwest of Well 33A and to the east and northeast of MW-16 through geophysical, geotechnical, and depth-specific sampling. Gather sufficient data to identify contaminant sources, define potential preferential pathways, and to install additional monitor wells to characterize the vertical and lateral extent of groundwater contamination and extraction wells, if determined necessary, for plume capture and/or groundwater cleanup.
- Measure the hydraulic properties of the UAU and the MAU at the Source Area beneath the Unidynamics facility by conducting aquifer testing. Characterize the hydraulic properties and hydraulic connection between Subunits A, B, and C of the UAU and the MAU throughout the known extent of contamination, focusing on areas where stratigraphic data suggests relatively high vertical permeability.
- Define the three-dimensional flow of contaminants of groundwater in the area through

Site-specific groundwater modeling. Evaluate the effectiveness of the remedial system through use of a Site-specific, three-dimensional groundwater model to simulate groundwater flow, quantification of plume capture, and simulation of fate and transport of contaminants in the UAU (Subunits A, B and C combined) and the MAU. Update all groundwater models with new data as acquired.

The Groundwater Investigation Workplan shall be an iterative document, utilizing investigation phases, and shall be updated at least annually until the objectives of the Groundwater Investigation are met. The first Groundwater Investigation Workplan shall be entitled the Initial Groundwater Investigation Workplan and all subsequent workplans shall be considered amendments to the Groundwater Investigation Workplan.

The Draft 2005 Groundwater Investigation Workplan submitted by Settling Defendants on November 1, 2004, shall constitute a draft of the Initial Groundwater Investigation Workplan. The Initial Groundwater Investigation Workplan shall provide a description and schedule for installation of wells according to the established priorities and conditions described in the Initial Borehole and Well Installation Schedule (Attachment C-1) and as shown on the Well Location Map (Attachment C-2), and include the development of a Site-specific groundwater flow model as described in Task 2.5. The Initial Groundwater Investigation Workplan may also include development of decision-making mechanisms, such as a decision tree, to assist in identification, investigation and evaluation of future locations to investigate to complete the Site groundwater characterization. Development and use of any such decision-making mechanisms shall be contingent upon the availability of sufficient groundwater analytical data and completion of an updated groundwater flow model developed in accordance with Task 2.5. The determination as to whether and to what extent such decision-making mechanisms will be utilized will be made by EPA, in its sole discretion. The progress of the Groundwater Investigation shall not be impeded due to the lack of sufficient data to fully utilize any decision-making mechanism. Until such

mechanisms are fully developed, Settling Defendants shall continue to conduct the Groundwater Investigation by gathering sufficient data to meet the objectives of the Groundwater Investigation.

The Initial Groundwater Investigation Workplan must include a full description of well locations, sampling locations and depths, pump test plans, aquifer test plans, and groundwater modeling plans (Task 2.5). The Groundwater Investigation Workplan must set forth procedures to conduct the following activities:

- installation of exploratory boreholes with Simulprobe or equivalent devices (similar to those used in the EPA Phase II Groundwater Investigation) to define the vertical and lateral extent of contamination, to characterize aquifer properties, and to characterize the contaminant pathways;
- installation of permanent monitoring wells to define the contaminant plumes and to monitor the effectiveness of remedial systems;
- geophysical measurements, pump testing, and aquifer testing to characterize the hydraulic properties of the UAU and MAU in the contaminated area; and
- groundwater modeling to simulate groundwater flow, hydraulic capture, and contaminant fate and transport.

The Initial Groundwater Investigation Workplan shall also include the methodology to be used to evaluate whether wells identified for previously deferred locations are required to fill data gaps for groundwater characterization and completion of the groundwater flow model and the fate and transport model (Task 2.5). The evaluation methodology may include use of decision-making mechanisms as discussed above.

The Groundwater Investigation Workplan shall be amended annually, at a minimum, as groundwater analytical data and modeling data results become available until EPA determines that

the objectives of the Groundwater Investigation have been met. Any proposed decision-making mechanisms may be developed and refined concurrently, and the status of those mechanisms and the data gaps to complete them shall be included in each Amended Groundwater Investigation Workplan.

Task 2.2.1 Schedule for Performance of Groundwater Investigation

Settling Defendants submitted a Draft 2005 Groundwater Investigation Workplan as the Initial Groundwater Investigation Workplan on November 1, 2004. The Final Initial Groundwater Investigation Workplan shall be submitted by Settling Defendants within thirty (30) days of receipt of EPA's comments on the Draft Workplan.

Each of the first two Groundwater Investigation Workplans shall provide a schedule for installation of individual wells according to established priorities and conditions as set forth in the Initial Well Installation Schedule (Attachment C-1) and as shown on the Well Location Map (Attachment C-2). Settling Defendants shall initiate installation of Priority 1 wells within thirty (30) days of EPA approval of the Initial Groundwater Investigation Workplan. Within the first twelve (12) months after EPA approval of the Initial Groundwater Investigation Workplan, Settling Defendants shall install all Priority 1 wells and all Priority 3 wells related to the Priority 1 wells that are required based upon the contingencies set forth in Attachment C-1. Within the subsequent twelve (12) months and pursuant to the first Amended Groundwater Investigation Workplan, Settling Defendants shall install all Priority 2 wells and all Priority 3 wells related to the Priority 2 wells that are required based upon the contingencies set forth in Attachment 1-A.

Within fifteen (15) days of completion of development of each well, Settling Defendants shall conduct water quality sampling and provide sampling results to EPA. Where sampling results indicate Site-specific contamination above Site-specific cleanup levels in wells identified as sentinel wells, Settling Defendants shall continue to sample that well monthly until sampling

shows levels below Site-specific cleanup levels for six (6) months. Where sampling results do not indicate Site-specific contamination above Site-specific cleanup levels and in wells not serving the function of sentinel well, each well shall be sampled quarterly. Sampling frequency of wells may be decreased or increased as deemed appropriate by EPA. Settling Defendants may submit recommendations for changes to the sampling frequency of specific monitor wells in the Annual Groundwater Monitoring Report (Task 1.2).

To estimate aquifer transmissivity in the vicinity of the new wells, within thirty (30) days of well installation and development, Settling Defendants shall perform aquifer tests (of a minimum of 8-hour duration) in at least one MAU well, in all Priority 1 and Priority 2 Subunit C wells, and in all Subunit A wells. Settling Defendants shall conduct additional longer-term aquifer testing of specified wells where required by EPA.

Settling Defendants shall submit a First Well Installation Report within ninety (90) days of the installation of the last Priority 1 well and a Second Well Installation Summary Report within ninety (90) days of the installation of the last Priority 2 well. The Well Installation Summary Reports shall summarize all data findings, including all geophysical, geotechnical, and water quality data, and include copies of maps showing locations of all test boreholes and new wells and copies of well-logs, analytical reports, and other supporting documentation related to well installation activities, and the findings therein shall be summarized in the Initial Groundwater Investigation Report (Task 2.7).

Following the well installation and testing activities as required in the Initial and First Amended Groundwater Investigation Workplans, Settling Defendants shall provide a summary of the results of these activities and how they met the objectives of this Groundwater Investigation. The summary shall identify any data gaps to be addressed in order to meet the Groundwater Investigation objectives. Should EPA determine that additional investigation is necessary in order

to meet the objectives, Settling Defendants shall submit an Amended Groundwater Investigation Workplan to EPA within sixty (60) days of EPA's determination. Each Draft Amended Groundwater Investigation Workplan shall describe the objectives of additional investigations, the DQOs, overview of the investigation strategy, description of the tasks associated with performing the groundwater investigation, and a schedule for performing the additional investigation. Settling Defendants shall submit an Amended Groundwater Investigation Workplan within thirty (30) days of receipt of EPA comments on the Draft. Settling Defendants shall conduct the additional groundwater investigations pursuant to that Amended Workplan.

At the conclusion of field work conducted pursuant to each Amended Groundwater Investigation Workplan, Settling Defendants shall provide a summary of the results of the activities and how they met the objectives of this Groundwater Investigation. If, based on a review of the summary and an evaluation of other Site-related information, and following consultation with Settling Defendants, EPA makes a written determination that additional data must be collected to meet the objectives of the Groundwater Investigation, Settling Defendants shall submit to EPA for review and approval a Draft Amended Groundwater Investigation Workplan within thirty (30) days of EPA's written determination. Settling Defendants shall submit the Amended Groundwater Investigation Workplan within thirty (30) days of receipt of EPA comments on the Draft. The scope of each Amended Groundwater Investigation Workplan shall be to obtain the necessary data to meet the objectives of the Groundwater Investigation through a quantified groundwater model and other relevant hydrogeological or water quality data for the Site. Settling Defendants shall conduct the additional groundwater investigations pursuant to the Amended Groundwater Investigation Workplan. Each Amended Groundwater Investigation Workplan shall include an update of the FSAP, QAPP, and Health and Safety Plan ("HASP") (Task 2.3).

Task 2.3 FSAP, QAPP, and HASP

An FSAP, QAPP, and HASP shall be developed, and/or existing plans shall be amended, to cover the groundwater investigation activities described in the Groundwater Investigation Workplan (Task 2.2). The FSAP and QAPP shall be developed in accordance with this Task and submitted as part of the Groundwater Investigation Workplan (Task 2.2).

Settling Defendants shall use quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance and monitoring samples in accordance with *EPA Requirements for Quality Assurance Project Plans* (QA/R5) (EPA/240/B-01/003, March 2001), *A Guidance for Quality Assurance Project Plans* (QA/G-5) (EPA/600/R-98/018, February 1998), and subsequent amendments to such guidelines upon notification by EPA to Settling Defendants of such amendments. Amended guidelines shall apply only to procedures conducted after such notification. Prior to the commencement of any monitoring under this SOW, Settling Defendants shall submit to EPA for review and approval a QAPP that is consistent with this SOW, the National Contingency Plan ("NCP"), and the applicable guidance documents described under this Task.

Settling Defendants shall ensure that laboratories utilized for the analysis of samples taken pursuant to this SOW analyze all samples pursuant to the QAPP for quality assurance monitoring. Settling Defendants shall ensure that those laboratories perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in *A Contract Lab Program Statement of Work for Inorganic Analysis*, ILM05.3 (updated from ILMO5.2 on February 2004) and *A Contract Lab Program Statement of Work for Organic Analysis*, OLMO4.3 (updated from OLMO4.2 on August 2003), and any amendments made thereto during the course of the implementation of this SOW; however, upon approval by EPA, Settling Defendants may use other analytical methods which are as stringent as or more stringent than the Contract Lab Program ("CLP") -approved methods. Settling Defendants shall ensure that all laboratories they use for analysis of samples taken pursuant to this CD participate in an EPA or EPA-equivalent Quality Assurance/Quality Control ("QA/QC") program. Settling

Defendants shall only use laboratories that have a documented Quality System that complies with ANSI/ASQC E4-1994, *A Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs* (American National Standard, January 5, 1995), and *EPA Requirements for Quality Management Plans* (QA/R-2) (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program ("NELAP") as meeting the Quality System requirements. Settling Defendants shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this SOW are conducted in accordance with the procedures set forth in the QAPP approved by EPA.

Settling Defendants shall submit to EPA a HASP for field investigation activities that conforms to the applicable Occupational Safety and Health Administration ("OSHA") and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

Task 2.4 Identify, Investigate, and Abandon Potential Conduit Wells

On September 30, 2004, Settling Defendants submitted a Draft Revised Conduit Well Investigation and Abandonment Workplan. Settling Defendants shall submit a Final Conduit Well Investigation and Abandonment Workplan by January 14, 2005, that addresses EPA's comments provided by letter dated December 3, 2004, and provides protocols for identification, investigation, and proper abandonment of wells that may be acting or could act as conduit wells for Site contamination. The Conduit Well Investigation and Abandonment Workplan shall also identify specific wells to be investigated, a priority ranking of those wells, where possible a priority ranking of wells to be potentially abandoned, and a schedule for conduit well investigation and abandonment.

Protocols to be followed in the Conduit Well Investigation and Abandonment Workplan shall include, but not be limited, to the following, as deemed appropriate by EPA:

- obtaining necessary access to investigate potential conduit wells;

- cleaning out potential conduit wells and exposing the well screens;
- completing video logs of the wells;
- conducting spinner log testing;
- conducting depth-specific water quality sampling;
- if aquifer data are needed, conducting pump tests, with transducers in nearby wells;
- installing temporary boreholes and/or permanent monitor wells adjacent to conduit wells;
- documenting the wells' as-built construction and completion designs; and
- setting forth well abandonment procedures in accordance with Arizona Department of Resources ("ADWR") regulations.

Within thirty (30) days of completion of investigation of any potential conduit well, Settling Defendants shall submit a Draft Conduit Well Investigation Report to EPA, ADEQ, and ADWR. The Conduit Well Investigation Report shall include a description of the well investigation activities, a description of the well condition, a schematic of the well, and the basis for concluding whether that well is a potential conduit well. If the Conduit Well Investigation Report indicates that the well is a potential conduit, the Report shall include a detailed description of the proposed method to abandon that well in accordance with ADWR abandonment regulations, and a proposed schedule for conducting well abandonment activities. Should Settling Defendants propose use of an alternative well investigation or abandonment procedure where it is not feasible to conduct any of the activities described in the previous paragraph for a particular well due to that well's particular conditions (*e.g.*, in cases where the well or casing has potential for collapse, or where obstructions are present in the well that cannot be removed), the Conduit Well Investigation Report shall provide full documentation of the well conditions, including photographs and video-logs, along with any alternative well abandonment proposal. Within thirty (30) days after receipt of EPA's comments on the Draft Report, Settling Defendants shall submit a Final Conduit Well Investigation Report that addresses those comments.

Should the Final Conduit Well Investigation Report set forth conduit well abandonment procedures, within thirty (30) days of EPA approval of the Report or in accordance with the schedule set forth in the Report, Setting Defendants shall implement the activities in the Final Conduit Well Investigation Report.

Should EPA or Settling Defendants identify a well as one that should be abandoned in an expedited manner, Settling Defendants shall indicate this fact in its Draft Conduit Well Investigation Report and submit the Conduit Well Investigation Report to EPA, ADEQ, and ADWR within fifteen (15) days of the conclusion of the investigation.

Within thirty (30) days of completing a well abandonment, Settling Defendants shall submit a Conduit Well Abandonment Report to EPA, ADEQ and ADWR documenting the well abandonment and detailing any deviations from well abandonment procedures described in the Final Conduit Well Investigation Report.

Task 2.5 Groundwater Models

Based on the data gathered in the Groundwater Investigation and existing information gathered pursuant to Task 2.1, Settling Defendants shall develop two groundwater models for the Site: a Site-specific groundwater flow model and a Site-specific fate and transport model. The models shall be prepared in sequence as discussed below. Should EPA make a written determination that the models must be updated, Settling Defendants shall update the models within ninety (90) days of EPA's determination.

Task 2.5.1. Groundwater Flow Model: By January 15, 2005, Settling Defendants shall submit to EPA for review and approval a Draft Site-specific, three-dimensional, quantitative Groundwater Flow Model and accompanying Groundwater Flow Model Report. The Groundwater Flow Model shall incorporate all existing Site information, including the distribution of contamination in the UAU (Subunits A, B, and C) and in the MAU. In addition,

the Groundwater Flow Model shall utilize information gathered from ongoing activities, including data from pertinent groundwater withdrawal locations and recharge locations that may influence Site-related contamination. The Groundwater Flow Model shall be developed to be compatible with and support contaminant fate and transport modeling.

The Groundwater Flow Model shall meet the following objectives:

- assist in optimization of design of remedial systems to control the movement of contaminants from the former Unidynamics facility;
- evaluate the potential threat to water supply wells from Site COCs;
- evaluate the effects of changes in local pumping patterns and recharge distribution on Site contamination;
- appropriately locate and screen monitor wells based on current and future anticipated groundwater flow directions; and
- estimate and compare relative rates of remediation alternatives.

The Groundwater Flow Model Report shall describe how output from the Groundwater Flow Model will be validated and updated with Site-specific monitor well data. The Groundwater Flow Model Report shall present the updated well and recharge location inventory, the model domain, construction and calibration details, modeling results, and a full electronic copy of the model code. The Groundwater Flow Model Report shall also include a delineation of 5-year capture zones for each water supply well, consistent with the most recent version of EPA's Wellhead Protection Area ("WHPA") program model and maps, based on various pumping scenarios, that identify threatened or "at-risk" supply wells, in accordance with Task 4.1. A water supply well shall be considered "at-risk" if it or a well within the well's 5-year time of travel contains detectable levels of any Site-related contamination. Following EPA approval of the initial Groundwater Flow Model, Settling Defendants shall submit Updated Model Reports every six (6) months (January 15 and July 15 of each year), unless reporting frequency is changed by EPA.

Task 2.5.2 Contaminant Fate and Transport Model: Within ninety (90) days of completion of installation of the Priority 1 and 2 wells, Settling Defendants shall submit to EPA for review and approval a Draft Site-specific Contaminant Fate and Transport Model that incorporates all existing Site information, including the distribution of contamination in the UAU (Subunits A, B, and C) and in the MAU. The Contaminant Fate and Transport Model shall utilize information gathered from ongoing activities as well as data from pertinent groundwater withdrawal and recharge locations that may influence Site-related contamination. To the extent possible with available data, the Contaminant Fate and Transport Model shall consider the effects of low permeability materials or "dead" zones within the groundwater flow field that will act to inhibit the progress of remediation. The Contaminant Fate and Transport Model shall be used in conjunction with the Groundwater Flow Model to estimate the time required to remediate Site-related COCs.

Task 2.6 Performance of Groundwater Investigation

Settling Defendants shall notify EPA with a Notification of Initiation of Field Work at least fifteen (15) days prior to initiating any physical work in the field. Upon submission of the Notification of Initiation of Field Work, Settling Defendants shall provide weekly field progress reports via electronic mail. The Notification of Initiation of Field Work must include the expected dates for field activities so that EPA may adequately schedule oversight tasks. Settling Defendants shall provide a written Notification of Completion of Field Work within five (5) days of completion of field work activities. Unless EPA disapproves the Notification of Completion of Field Work, weekly field progress reports may be discontinued upon Notification of Completion of Field Work.

Task 2.7 Groundwater Investigation Report

Within ninety (90) days of submittal of the Notification of Completion of Field Work, Settling Defendants shall submit a Groundwater Investigation Report that incorporates the results

of the entire Groundwater Investigation. The Groundwater Investigation Report shall include, but not be limited to, a description of the groundwater investigation objectives, a description of the field investigations to meet the identified objectives, a description of the groundwater modeling conducted to meet the identified objectives, a revised SCM, a summary of all the data results including copies of original analytical reports, a description of the nature and extent of groundwater contamination based on the field investigations and modeling results, a description of the fate and transport of groundwater contamination based on the field investigations and modeling results, and recommendations for additional phases of investigative activities where data gaps were not adequately filled.

Within thirty (30) days of receipt of EPA's comments on the Draft Groundwater Investigation Report or within sixty (60) days of completion of field work required by the Final Amended Groundwater Investigation Workplan, whichever comes later, Settling Defendants shall submit to EPA for review and approval a Final Groundwater Investigation Report that incorporates EPA comments.

Consistent with Paragraph 13 of the Consent Decree, as an addendum to the Groundwater Investigation Report, Settling Defendants may submit a petition requesting that EPA consider specific modifications to implementation of the existing remedy or fundamental changes to the remedy selected in the ROD. Such petition must include a description of the proposed modifications or remedy changes, a discussion of how the proposed modifications or changes may enhance or expedite Site cleanup, reduce cleanup costs, or provide other substantial benefit sufficient to justify the modifications or remedy changes, and all information and analyses supporting the proposed modifications or remedy changes.

Should EPA make a written determination pursuant to Paragraph 14 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-Related information, that a modification to the implementation of the remedy selected in the ROD is appropriate, Settling

Defendants shall, within thirty (30) days of EPA's determination, submit a Modification Workplan to EPA for review and approval. The Modification Workplan shall include a description of the technical basis for the proposed modification, a specific proposal for implementing the proposed modification, and a proposed schedule for implementing the modification. Upon approval of the Modification Workplan, Settling Defendants shall implement the proposed modification in accordance with the approved Modification Workplan and schedule.

Should EPA make a written determination pursuant to Paragraph 18 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-related information, that a fundamental change to the remedy selected in the ROD may be required, Settling Defendants shall initiate the SFS process as directed by EPA and consistent with Task 12.0 of this SOW.

Summary of Task 2.0 Deliverables and Schedule:

• Draft Initial Groundwater Investigation Workplan and draft FSAP, QAPP, and amended HASP	November 1, 2004
• Final Initial Groundwater Investigation Workplan and Final FSAP and QAPP	30 days after receipt of EPA comments
• Initiate Installation of Initial Wells	30 days after EPA approval of Initial Groundwater Investigation Workplan and Schedule
• Initial Well Installation Summary Reports	90 days of installation of last Priority 1 well and Second Report within 90 days of installation of last Priority 2 well
• Draft Amended Groundwater Investigation Workplan, revised draft FSAP and QAPP	12 months after EPA approval of Initial Groundwater Investigation Workplan or 30 days after EPA written determination that

	an amendment is necessary
• Final Amended Groundwater Investigation Workplan, and Final FSAP and QAPP	30 days after receipt of EPA comments
• Initiate Additional Field Investigation	30 days after EPA approval of Final Amended Groundwater Investigation Workplan and Schedule
• Draft Groundwater Modification Workplan	45 days after notification from EPA that modification of groundwater extraction system is necessary
• Final Groundwater Modification Workplan	30 days after receipt of EPA comments
• Initiate Groundwater Remedy Modification	30 days after EPA approval of Workplan
• Draft Groundwater Investigation Report	90 days of submittal of Notification of completion of field work
• Final Groundwater Investigation Report Report	30 days after receipt of EPA comments or within 60 days of completion of field work required by an investigation amendment, whichever comes later
• Draft Groundwater Flow Model Report	January 15, 2005
• Draft Groundwater Fate and Transport Model	90 days after installing last Priority 2 well
• Updated Groundwater Flow Model Reports	January 15 and July15, unless EPA changes Reporting frequency
• Updated Groundwater Fate and Transport Model	90 days after EPA review of Draft Model and every 6 months thereafter
• Final Conduit Well Investigation and Abandonment Workplan and Schedule	January 14, 2005
• Conduit Well Investigation Reports	30 days after completion of investigation or 15 days after completion of investigation if

		expedited abandonment is necessary
•	Initiate Abandonment of Conduit Wells	30 days after EPA approval of Conduit Well Investigation Report
•	Conduit Well Abandonment Reports	30 days after completion of well abandonment

Task 3.0 Groundwater Monitoring

The objectives of Task 3.0 are to:

- continue the current Site groundwater monitoring program while establishing an updated Site Groundwater Monitoring Plan;
- continue periodic (annual, semi-annual, quarterly, monthly and/or weekly, as specified in the annual Groundwater Monitoring Plan) monitoring of all wells, with greater monitoring frequency for threatened and previously contaminated wells and for drinking water supply wells;
- establish and implement an updated comprehensive Groundwater Monitoring Plan to include, but not be limited to, an updated inventory of all wells in the vicinity of the Site, identification of the wells to be sampled, the rationale and frequency for sampling each well, the COCs to be analyzed for in each well, the analytical methods to be used, the sampling procedures to be followed, and the O&M procedures to be followed for the monitor well network; and
- annually update the Groundwater Monitoring Plan.

Task 3.1 Update Groundwater Monitoring Plan

Settling Defendants shall submit a Draft 2005 Groundwater Monitoring Plan by March 1, 2005, that incorporates the comments EPA provided to Settling Defendants on December 9, 2004, on the 2004 Groundwater Monitoring Plan. Settling Defendants shall submit a Revised 2005 Groundwater Monitoring Plan within 30 days of receipt of EPA's comments on the Draft 2005 Groundwater Monitoring Plan. The Revised 2005 Groundwater Monitoring Plan shall

include, but not be limited to, an updated inventory of all wells in the Site vicinity, identification of the wells to be sampled, the rationale and frequency for sampling each well, the COCs to be analyzed for in each well, the analytical methods to be used, the sampling procedures to be followed, and the O&M procedures to be followed for the groundwater monitoring well network. Settling Defendants shall update the Groundwater Monitoring Plan annually to reflect any new data collected during the prior year, provide a summary evaluation of groundwater trends, and document EPA-approved modifications to the monitoring program for the next year that were presented in the Annual Groundwater Monitoring Report.

Task 3.2 Revise Groundwater Monitoring FSAP, QAPP, and HASP

Settling Defendants shall submit a revised Groundwater Monitoring FSAP and QAPP within thirty (30) days of receipt of EPA's comments on the Draft Groundwater Monitoring FSAP and QAPP. Should EPA make a written determination that investigation at the Site has revealed Site COCs that are not adequately addressed in the FSAP and QAPP, or that the Groundwater Monitoring FSAP, QAPP, and/or HASP must be updated to address modifications to the Groundwater Monitoring Plan (Task 3.1), Settling Defendants shall submit a new or an updated Groundwater Monitoring FSAP, QAPP, and/or HASP within sixty (60) days of EPA's determination. The Groundwater Monitoring FSAP, QAPP, and HASP shall be developed in accordance with the requirements described in Task 2.3.

Task 3.3 Conduct Groundwater Monitoring

Settling Defendants shall implement the groundwater monitoring program in accordance with the EPA-approved Groundwater Monitoring Plan (Task 3.1) and the new or amended Groundwater Monitoring FSAP, QAPP, and HASP (Task 3.2).

Task 3.4 Groundwater Monitoring Reporting

Settling Defendants shall continue the monthly, quarterly and annual reporting program described in the 1998 O&M Plan for all components of the existing groundwater remedy. In

addition, Settling Defendants shall continue weekly reporting via electronic mail ("Weekly Update"). Settling Defendants shall provide immediate notice to EPA upon discovery of a significant increase of Site COCs, as defined later in this Section.

Quarterly Groundwater Monitoring Reports shall include a description of monitoring activity conducted during the previous quarter, a chronological data summary of water level measurements and water quality analyses for all monitor wells (including wells periodically or no longer sampled), discussion of the distribution of COCs in the UAU (Subunits A, B and C) and the MAU, discussion of any QA/QC issues that arose in the previous quarter, and an assessment of plume capture. Settling Defendants shall address all of EPA comments on any quarterly report in the following quarterly report.

Annual Groundwater Monitoring Reports shall include all elements required for the Quarterly Groundwater Monitoring Reports and also shall include the following: a description of the scope and objectives of the monitoring program, a summary of historical Site-related groundwater investigation and monitoring activities, total volume of groundwater extracted and total mass of contaminants removed, a description of any groundwater investigation activities conducted that year, identification of any new COCs or changes in COC distribution, and any recommendations for changes, or additions or deletions to the monitor and extraction well network, including recommendations for changes to the monitoring frequency for specific wells. Within thirty (30) days of receipt of EPA comments on the Annual Groundwater Monitoring Report, Settling Defendants shall submit a revised Annual Groundwater Monitoring Report addressing EPA's comments.

Should concentrations of any Site-related COC in any well indicate a significant increase, defined as equaling or exceeding twice the concentration from the previous sampling event and exceeding the Site-specific cleanup level, Settling Defendants shall inform the EPA RPM by telephone within twenty-four (24) hours of the discovery of the increase followed by

written confirmation within five (5) days.

Summary of Task 3.0 Deliverables & Schedule

• Quarterly Groundwater Monitoring Reports	60 days after end of the quarter
• Annual Groundwater Monitoring Reports	60 days after end of the calendar year
• Draft 2005 Groundwater Monitoring Plan	March 1, 2005
• Revised 2005 Groundwater Monitoring Plan	30 days after receipt of EPA comments
• Final updated FSAP and QAPP	30 days after receipt of EPA comments
• Updated FSAP, QAPP and HASP	60 days after EPA determination that updates are necessary
• Updated Groundwater Monitoring Plan	March 1

Task 4.0 Protection of Drinking Water Supply Wells

The objectives of Task 4.0 are to:

- identify wells that are part of the Site area's domestic water supply that are at-risk of being impacted by Site-related contamination;
- increase monitoring of areas where domestic water supply is at-risk through sampling of existing or supplemental wells to determine whether Site-related contaminants have reached or are approaching Site-specific cleanup levels or performance standards;
- provide for additional sentinel wells and/or extraction wells where necessary to control plume migration and prevent potential contamination of drinking water supply wells; and
- implement measures to ensure provision of an uninterrupted water supply, either through wellhead treatment or by providing an alternative source of domestic water, where domestic supply wells contain Site-related contaminants at or approaching Site-specific cleanup standards or performance levels.

Task 4.1 Identification of Threatened Water Supply Wells

Settling Defendants shall evaluate whether any domestic water supply wells in the vicinity of the PGA-North plume are "at-risk" of exceeding Site-specific cleanup standards or performance levels for Site COCs. Using the Groundwater Flow Model, as set forth in Task 2.5.1, a domestic water supply well shall be identified as "at-risk" if that well or a well within that well's 5-year time of travel as predicted using EPA's WHPA program model contains any Site-related contaminant above the Site-specific cleanup levels or performance standards. Where EPA identifies that a well is "at-risk," Settling Defendants shall increase frequency of sampling that well to monthly or weekly, in accordance with the threat, as prescribed by EPA. The list of domestic water supply wells of potential concern and the proposed sampling program shall be described in the Groundwater Monitoring Plan (Task 3.2) and shall be updated no less than annually. Should Settling Defendants identify an "at-risk" well, Settling Defendants shall provide notice to EPA by telephone call within forty-eight (48) hours of the discovery that the well is at-risk followed by written confirmation within five (5) days. Should concentrations in any well that historically has been below Site-specific cleanup or performance standards exceed Site-specific cleanup or performance standards for the first time, Settling Defendants shall inform EPA by telephone call within twenty-four (24) hours of the discovery that the well contains such concentrations followed by written confirmation within five (5) days.

Task 4.1.1 Well Installation for Well Protection

Should EPA determine, based upon a proposal from Settling Defendants or based upon information from the Groundwater Investigation or other relevant information, that there exists a potential or actual threat to a drinking water supply well that could be addressed through the addition of sentinel or extraction wells, Settling Defendants shall submit a Well Installation Workplan and schedule to install the subject wells. The Well Installation Workplan shall include, but not be limited to, the relevant information required in Task 2.2. Settling Defendants shall submit a Draft Well Installation Workplan to EPA for review and comment within forty-five (45) days of EPA's determination that such wells are necessary. Settling Defendant shall

submit a Final Well Installation Workplan within thirty (30) days of receipt of EPA's comments on the Draft Workplan, and shall implement the Final Well Installation Workplan consistent with the approved schedule therein.

Task 4.2 Wellhead Treatment/Alternative Water Supply Workplan

Within thirty (30) days of a written determination by EPA that a well is "at-risk," Settling Defendants shall submit a Draft Wellhead Treatment/Alternative Water Supply Workplan to ensure ongoing domestic water supply is provided to those served by the well that is "at-risk." The Wellhead Treatment/Alternative Water Supply Workplan shall include, but not be limited to, a proposal to either treat or replace a domestic water supply well in the short-term, a proposal to treat or replace a domestic water supply well permanently, a description of the tasks associated with implementing treatment or providing alternative water supply, a plan to monitor the well following treatment or replacement, and a schedule for conducting these activities. The proposals in the Wellhead Treatment/Alternative Water Supply Workplan shall be consistent with 40 C.F.R. Part 300, Appendix D, Subpart (f). A Final Wellhead Treatment/Alternative Water Supply Workplan shall be submitted within thirty (30) days of receipt of EPA's comments on the Draft Workplan.

Task 4.3 Implement Wellhead Treatment/Alternative Water Supply

Should Site-related contamination in a domestic water supply well reach levels at or above Site-specific cleanup standards or performance levels, Settling Defendants shall ensure provision of an ongoing water supply in accordance with the EPA-approved Wellhead Treatment/Alternative Water Supply Workplan for that well and attendant schedule (Task 4.2).

Task 4.4 Continue Protection of Domestic Water Supplies

Settling Defendants shall continue to protect domestic water supplies through its ongoing activities at the Park Shadows Country Homes development and at City of Goodyear well, COG-02.

Park Shadows Country Homes: By March 1, 2005, Settling Defendants shall provide a Park Shadows Country Homes Alternative Water Supply Report summarizing the activities related to removal of the Park Shadows Irrigation and Domestic wells from the domestic water supply and installation of a water connection for Park Shadows Country Homes to the City of Goodyear public drinking water system. The Park Shadows Water Supply Report shall include, but not be limited to, a summary of the monitoring results from both the irrigation and domestic wells, activities related to the abandonment of the Park Shadows Irrigation Well, activities related to conversion of the Park Shadows Domestic Well to an irrigation supply well, and the temporary and permanent connection of Park Shadows Country Homes to the City of Goodyear's public water supply.

COG-02: By December 23, 2004, Settling Defendants shall submit a Draft Hydrophysical Investigation Workplan for COG-2 to conduct additional testing in that well followed by either wellhead treatment or proper abandonment of COG-02, as set forth in EPA's letter of November 23, 2004. Settling Defendants shall submit a Final Hydrophysical Investigation Workplan for COG-2 within 30 days of receipt of EPA comments on the Draft Workplan. Settling Defendants shall begin work pursuant to the schedule set forth in the Workplan. Based upon the results of the Hydrophysical Investigation, EPA shall make a written determination of whether COG-02 must be abandonned or must be fitted with wellhead treatment. Within fifteen (15) days of EPA's determination, Settling Defendants shall submit a COG-02 Abandonment Workplan or a COG-02 Wellhead Treatment Workplan as set forth in Tasks 2.4 and 4.5.

Task 4.5 Wellhead Treatment/Alternative Water Supply Report

Within thirty (30) days of completion of work pursuant to a Wellhead Treatment/ Alternative Water Supply Workplan, Settling Defendants shall submit a Wellhead Treatment/ Alternative Water Supply Report to include, but not be limited to, a summary of conditions

requiring the wellhead treatment or alternative water supply provision, a description of the work conducted pursuant to the Wellhead Treatment/Alternative Water Supply Workplan, a summary of the monitoring results during and after the well was removed from service, construction diagrams and specifications for any actions taken, including photographs, plans, and schedules, and a description of how the water supply for those previously served by the well taken out of domestic supply service will be maintained.

Summary of Task 4.0 Deliverables and Schedule

• Draft Hydrophysical Investigation Workplan for COG-2	December 23, 2004
• Final Hydrophysical Investigation Workplan for COG-2	Within 30 days of receipt of EPA comments
• Draft Wellhead Treatment/Alternative Water Supply Workplan	30 days after EPA written determination that a well is "at-risk"
• Final Wellhead Treatment/Alternative Water Supply Workplan	15 days after receipt of EPA comments
• Initiate Wellhead Treatment, Alternative Water Supply or Well Abandonment	30 days after EPA approval of Workplan
• Draft Wellhead Treatment/Alternative Water Supply Report	30 days after completion of work specified in Report
• Final Wellhead Treatment/Alternative Water Supply Report	30 days after receipt of EPA comments
• Draft Park Shadows Water Supply Report	March 1, 2005
• Final Park Shadows Water Supply Report	30 days after receipt of EPA comments

Task 5.0 Main Drywells Source Area Investigation

The objectives of Task 5.0 are to:

- characterize the potential for the area in the Main Drywells Source Area, which includes

and surrounds the four main drywells located west of the main Unidynamics production building (also referred to as SWMU #1) to be acting as a continuing source of groundwater contamination in subsurface soils, soil gas, and groundwater at the Site;

- utilize Site remedies to address contaminant sources or DNAPL; and
- develop recommendations to modify the existing Site remedy as necessary to ensure that the remedy is operating fully and effectively to address the Main Drywells Source Area.

The objectives of Task 5.0 only address potential sources of VOC contamination in the area of the Unidynamics Property described as the Main Drywells Source Area and do not address identification of additional COCs or characterization of source areas, surface soils, subsurface soils, soil gas, groundwater, facility structures, or potential exposures in other areas of the Unidynamics Property or the Site. Characterization of the other areas is addressed in Task 2.0 Groundwater Investigation, Task 8.0 Soil Gas Investigation and, and Task 10.0 Source Areas, Soils and Facility Structures Remedial Investigation.

Task 5.1 Compile and Review Information Related to Main Drywells Source Area

Settling Defendants shall compile and review relevant information regarding the location, nature and extent of potential active sources of groundwater contamination at the Site in the vicinity of the Main Drywells Source Area, including the *Draft Site Briefing Package, Phoenix-Goodyear Airport North Superfund Site* (Geomatrix Consultants, Inc., May 2002) ("*Site Briefing Package*"). Relevant information includes, but is not limited to, Site records and regulatory documents regarding the types of chemicals used at the Main Drywells Source Area location; where and how chemicals and wastes were stored, transported and disposed of in the Main Drywells Source Area vicinity; and the location of nearby sewerage and waste lines. Settling Defendants shall also review existing groundwater data, soil data, and hydrogeological information regarding the Main Drywells Source Area that could aid in assessing the potential presence of continuing sources of contamination to the groundwater.

Task 5.2 Main Drywells Source Area Investigation Workplan

By September 1, 2004, Settling Defendants shall submit a revised Main Drywells Source Area Investigation Workplan addressing EPA's August 2, 2004 comments on Settling Defendants' *Source Area Investigation, Phoenix-Goodyear Airport - North Superfund Site (ARCADIS,* June 3, 2004*)*. The Main Dywells Source Area Investigation Workplan shall include, but not be limited to, an updated SCM, a description of data gaps in the vicinity of the Main Drywells Source Area, a description of the DQOs, an overview of the investigation strategy, a description of the investigation tasks, and a schedule for performing the investigation. The description of data gaps shall include, but not be limited to, a description of the data needed to identify COCs, to characterize the nature and extent of the Main Drywells Source Area, and to model the fate and transport of contaminants. The Main Drywells Source Area Investigation Workplan shall also include activities associated with treatability studies, including, but not limited to, the bench-scale laboratory activities proposed in the EPA-approved Revised *Treatability Workplan - In-Situ Reactive Zone™ Technology - Phoenix-Goodyear Airport North Superfund Site* (ARCADIS G&M, Inc., May 14, 2004) ("*In-Situ Treatability Study Workplan*"). Upon completion of the bench-scale laboratory activities, Settling Defendants shall submit an In-Situ Bench-Scale Study Report summarizing the results. Within sixty (60) days of EPA approval of the Bench-Scale Study Report, Settling Defendants shall submit a Draft Pilot-Scale and Full-Scale Treatability Study Workplan, if appropriate. If other treatability studies are proposed in the future for the Main Dywells Source Area or other areas of the facility, Settling Defendants shall submit a comprehensive workplan for these studies.

Source areas investigations, including the Main Drywells Source Area Investigation, associated with conducting treatability studies shall be performed in accordance with applicable guidance documents, including *Technical and Regulatory Requirements for In-Situ Bioremediation of Chlorinated Solvents in Groundwater* (ITRC, 1998) and *Guide for Conducting Treatability Studies under CERCLA* (EPA, 1992). In addition, any treatability studies conducted

as part of the Main Drywells Source Area Investigation shall evaluate the applicability and feasibility of technologies designed to control sources by removing, degrading, and/or containing contamination in the source areas.

Task 5.3 FSAP, QAPP, and HASP

Settling Defendants shall revise the FSAP, QAPP, and HASP to address the activities described in the Main Drywells Source Area Investigation Workplan (Task 5.2) in accordance with EPA's August 2, 2004 comments on the *Draft Quality Assurance Project Plan Addendum, Source Area Investigation, Phoenix-Goodyear Airport - North Superfund Site (ARCADIS,* June 3, 2004*)*. Settling Defendants shall submit a Final FSAP and QAPP for the investigation of the Main Drywells Source Area Investigation, in accordance with the requirements of Task 2.3, by September 1, 2004.

Task 5.4 Main Drywells Source Area Investigation

Within thirty (30) days of EPA approval of the Main Drywells Source Area Investigation Workplan and FSAP and QAPP, Settling Defendants shall initiate the Main Drywells Source Area Investigation. Settling Defendants shall notify EPA with a Notification of Initiation of Field Work at least fifteen (15) days prior to initiating any physical work in the field. Upon submission of the Notification of Initiation of Field Work, Settling Defendants shall provide Weekly Updates via electronic mail. The Notification of Initiation of Field Work must include the expected dates for field activities so that EPA may adequately schedule oversight tasks. Settling Defendants shall provide a written Notification of Completion of Field Work within five (5) days of completion of field work activities. Unless EPA disapproves the Notification of Completion of Field Work, Weekly Updates on the Main Drywells Source Area Investigation may be discontinued upon Notification of Completion of Field Work.

If at any time EPA makes a written determination, based on an evaluation of Site-related

information including, but not limited to, information collected pursuant to the Main Drywells Source Area Investigation Workplan, and following consultation with Settling Defendants, that additional data must be collected to meet the objectives of the Main Drywells Source Area Investigation, Settling Defendants shall submit to EPA for review and approval an amendment to the Main Drywells Source Area Investigation Workplan ("Main Drywells Source Area Investigation Workplan Amendment") within thirty (30) days of EPA's written determination. The Main Drywells Source Area Investigation Workplan Amendment shall describe the objectives of additional investigation, the DQOs, overview of the investigation strategy, description of the tasks associated with performing the groundwater investigation, and a schedule for performing the additional investigation. In addition, Settling Defendants shall amend the FSAP, QAPP, and HASP to the extent necessary. Settling Defendants shall submit a Final Main Drywells Source Area Investigation Workplan Amendment within thirty (30) days of receipt of EPA comments on the Draft. Settling Defendants shall conduct the additional groundwater investigations pursuant to the Main Drywells Source Area Investigation Workplan Amendment and schedule.

Task 5.5 Conduct Main Drywells Source Area Treatability Studies

Settling Defendants shall conduct treatability studies in accordance with EPA-approved workplans. The treatability studies identified bySettling Defendants, including studies to evaluate alternative technologies such as microbiologically enhanced reductive dechlorination, nano-scale zero valent iron ("ZVI") or other technologies for treatment of TCE and perchlorate, shall be performed in accordance with the EPA-approved In-Situ Treatability Study Workplan, and in accordance with EPA's *Guide for Conducting Treatability Studies Under CERCLA* (EPA,1992)("EPA Treatability Study Guidance"). Treatability studies that are not described in the In-Situ Treatability Study Workplan shall be implemented in accordance with the Main Drywells Source Area Investigation Workplan (Task 5.2) or separate EPA-approved workplans along with the appropriate EPA-approved FSAP and QAPP.

Task 5.6 Main Drywells Source Area Remediation

In the event that the Main Drywells Source Area Investigation identifies VOC contamination in soils that poses a threat to groundwater or indoor air that can be addressed by either soil vapor extraction ("SVE") or excavation, such contamination in soils shall be addressed in accordance with the ROD. If the Main Drywells Source Area Investigation identifies other contamination not addressed in the ROD, such as explosives or inorganic contamination, investigation and remediation of that contamination shall be addressed using the procedures set forth in the Source Areas, Soils and Facility Structures Investigation (Tasks 10.0, 10.7, and 10.11).

Task 5.7 Main Drywells Source Area Investigation Report

Settling Defendants shall develop a Main Drywells Source Area Investigation Report that includes, but is not limited to, a description of the investigation objectives, a description of the field investigations to meet the identified objectives, an updated SCM, a description of the nature and extent of the Main Drywells Source Area, and a description of the relative significance of the Main Drywells Source Area based on vertical and lateral extent of contamination, COC concentrations, total mass of contamination, dissolution rates, and the hydrogeology in the vicinity of the Main Drywells Source Area. The Main Drywells Source Area Investigation Report shall also present the results of any treatability studies conducted as part of the investigation, including a description of the treatability study objectives, the parameters used to evaluate the success of the treatability study, the treatability study results, and the treatability study conclusions. Finally, the Main Drywells Source Area Investigation Report shall include a summary of all the data results, including original analytical reports and recommendations for additional phases of investigation where all the data gaps are not filled.

Within thirty (30) days of receipt of EPA's comments on the Draft Main Drywells Source Area Investigation Report or within sixty (60) days of completion of the fieldwork required by

the Main Drywells Source Area Investigation Workplan Amendment, whichever comes later, Settling Defendants shall submit to EPA for review and approval a Final Main Drywells Source Area Investigation Report that incorporates the results of the entire Main Drywells Source Area Investigation.

Consistent with Paragraph 13 of the CD, as an addendum to the Main Drywells Source Area Investigation Report, Settling Defendants may submit a petition requesting that EPA consider specific modifications to implementation of the existing remedy or fundamental changes to the remedy selected in the ROD. Such petition must include a description of the proposed modifications or remedy changes, a discussion of how the proposed modifications or changes may enhance or expedite Site cleanup, reduce cleanup costs, or provide other substantial benefit sufficient to justify the modifications or remedy changes, and all information and analyses supporting the proposed modifications or remedy changes.

Should EPA make a written determination pursuant to Paragraph 14 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-Related information, that a modification to the implementation of the remedy selected in the ROD is appropriate, Settling Defendants shall, within thirty (30) days of EPA's determination, submit a Modification Workplan to EPA for review and approval. The Modification Workplan shall include a description of the technical basis for the proposed modification, a specific proposal for implementing the proposed modification, and a proposed schedule for implementing the modification. Upon approval of the Modification Workplan, Settling Defendants shall implement the proposed modification in accordance with the approved Modification Workplan and schedule.

Should EPA make a written determination pursuant to Paragraph 18 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-related information, that a

fundamental change to the remedy selected in the ROD may be required, Settling Defendants shall initiate the SFS process as directed by EPA and consistent with Task 12.0 of this SOW.

Summary of Task 5.0 Deliverables and Schedule

• Final Main Drywells Source Area Investigation Workplan	30 days after receipt of EPA comments
• Final FSAP, QAPP, and HASP	30 days after receipt of EPA comments
• Initiate Main Drywells Source Area Field Investigation	30 days after EPA approval of Workplan
• Draft Main Drywells Source Area Investigation Report	90 days after submittal of Notice of Completion of Field Work
• Final Main Drywells Source Area Investigation Report	30 days after receipt of EPA comments
• Draft Main Drywells Source Area Investigation Workplan Amendment	30 days after EPA determination that further investigation is warranted
• Final Main Drywells Source Area Investigation Workplan Amendment	30 days after receipt of EPA comments
• Draft Amended Main Drywells Source Area Investigation Report	90 days after submittal of Notice of Completion of Amended Field Work
• Final Amended Main Drywells Source Area Investigation Report	30 days after receipt of EPA comments
• Conduct In-Situ Bench Scale Study	30 days after EPA approval of Workplan
• Draft In-Situ Bench Scale Study Report	90 days after completing study
• Final In-Situ Bench Scale Study Report	30 days after receipt of EPA comments
• Draft Pilot Studies and Full-Scale Treatability Study Workplan	60 days after EPA approval of Bench Scale Study Report and EPA approval to proceed
• Final Pilot Studies and Full-Scale	30 days after receipt of EPA comments

Treatability Study Workplan	
• Initiate Pilot Studies and Full-Scale Treatability Study	30 days after EPA approval of Workplan

Task 6.0 Perchlorate Treatability Study

The objectives of Task 6.0 are to:

- develop sufficient data to evaluate the use of the City of Goodyear's Wastewater Treatment Plant ("GWWTP") or a functionally equivalent wastewater treatment system as an alternative to treat perchlorate contamination in groundwater at the Site; and
- develop sufficient data to compare the use of the GWWTP or a functionally equivalent wastewater treatment system to other potential perchlorate treatment alternatives in an SFS.

Task 6.1 Complete GWWTP Pilot-Scale Study

Settling Defendants shall continue and complete pilot-scale testing currently underway as a part of the Perchlorate Treatability Study at the GWWTP in accordance with the *Pilot Scale Report for the Evaluation of the Goodyear Wastewater Treatment Plant to Treat Perchlorate* (Geomatrix Consultants, Inc., August 28, 2003) and any future EPA-approved amendments to that treatability study.

Task 6.2 Perchlorate Treatability Study Report

Within sixty (60) days of completion of the pilot-scale testing, Settling Defendants shall submit a GWWTP Perchlorate Treatability Study Report that will provide the necessary technical information to evaluate the GWWTP or a functionally equivalent wastewater treatment system as an ex-situ treatment alternative to treat perchlorate-contaminated groundwater. The Perchlorate Treatability Study Report shall summarize the data from all phases of the Perchlorate Treatability Study at the GWWTP (*e.g.*, Method Detection Limit, Bench-Scale, Pilot-Scale, Full-Scale),

evaluate the effectiveness of the GWWTP or a functionally equivalent wastewater treatment system as a perchlorate treatment alternative, describe the uncertainty associated with the Perchlorate Treatability Study results, describe the capital costs and O&M costs associated with using the GWWTP or a functionally equivalent wastewater treatment system for perchlorate treatment, describe commitments necessary and obtained regarding provision of facilities to conduct perchlorate treatment at the GWWTP or functionally equivalent wastewater treatment system, and identify any potential issues and concerns associated with use of the GWWTP or a functionally equivalent wastewater treatment system. The Perchlorate Treatability Study Report shall also provide recommendations for any additional testing necessary to evaluate the GWWTP or a functionally equivalent wastewater treatment system as a permanent perchlorate treatment alternative and recommendations for any other treatability studies to address perchlorate contamination. Recommendations from the Perchlorate Treatability Study Report shall be incorporated into the alternatives analysis evaluation in the SFS (Task 12.0) for selection of a final remedy for perchlorate at the Site.

Should EPA, based on review of Settling Defendants' recommendations in the Perchlorate Treatability Study Report and any information from other investigations in this SOW, determine that additional treatability studies to address perchlorate contamination should be conducted, Settling Defendants shall submit for EPA review and approval a Perchlorate Treatability Study Workplan within sixty (60) days of EPA's determination. The Perchlorate Treatability Study Report shall include proposals and schedule for activities including, but not limited to, Method Detection Limit Testing, Bench-Scale Testing, Pilot-Scale Testing, and Full-Scale Testing. The Perchlorate Treatability Study Workplan shall follow protocol as set forth in EPA's *Treatability Study Guidance* and other applicable guidance.

Summary of Task 6.0 Deliverables and Schedule

- Draft GWWTP Perchlorate Treatability — 60 days after completion of Treatability

	Study Report	Study
•	Final GWWTP Perchlorate Treatability Study Report	30 days after receipt of EPA comments
•	Draft Perchlorate Treatability Study Workplan	60 days after EPA written determination that a Treatability Study is necessary
•	Final Perchlorate Treatability Study Workplan	30 days after receipt of EPA comments

SOIL GAS

Activities outlined in the soil gas media component of this SOW relate to the investigation, removal, and remediation of contaminated vapors in subsurface soils and ambient air at the Site. Activities for the soil gas media component include retrofitting and operation of the SVE system, identification of additional source areas, characterization of the extent of soil gas contamination and contaminant migration pathways, installation of SVE wells and soil vapor monitor ("SVM") wells, completion of treatability studies to evaluate alternatives to enhance subsurface soil gas removal, and identification of measures to minimize or eliminate vapor intrusion into occupiable buildings or into exterior ambient air at concentrations exceeding levels of concern.

On May 19, 2004, Settling Defendants began operating the SVE system as specified in the *Soil Vapor Extraction System Workplan for the Former Unidynamics Phoenix, Inc. Facility, EPA ID#ASD980695902* (CH2M Hill, November 2003), and EPA's comments dated January 19, 2004 and April 9, 2004 (collectively, "SVE Workplan").

Settling Defendants shall conduct activities outlined under Tasks 7.0 - 12.0 concurrent with the ongoing operation and maintenance of the SVE system as required by the SVE Workplan. Settling Defendants shall update the existing 1998 O&M Plan to reflect the current

operation and maintenance requirements of the SVE system and operate the SVE system in accordance therewith.

Task 7.0 Retrofit and Operate SVE System

The objectives of Task 7.0 are to:

- operate and maintain the Site's SVE system;
- update the O&M Plan for the soil gas remedy; and
- modify the remedial design as determined necessary to ensure capture and treatment of Site COCs in soil vapor.

Task 7.1 SVE Implementation

Settling Defendants shall implement the SVE remedy at the Site in accordance with the SVE Workplan and applicable sections of the 1998 O&M Plan, or any updated O&M Plan developed pursuant to Task 7.4, until otherwise directed by EPA.

Task 7.2 SVE Operation and Maintenance Plan

By April 1, 2005, Settling Defendants shall update the 1998 O&M Plan to reflect necessary modifications to the ongoing operation and maintenance of the SVE system to reflect its current configuration including the use of granular activated carbon ("GAC") to treat contaminated soil vapors. The updated Draft O&M Plan for the existing SVE system, including the SVE and SVM well network, shall be developed in accordance with Task 14.6. Settling Defendants shall submit a Final SVE O&M Plan for the operation of the SVE system with GAC within thirty (30) days of receipt of EPA's comments on the Draft O&M Plan.

Task 7.3 Reporting

Settling Defendants shall continue the monthly and quarterly reporting program described in the 1998 O&M Plan for all components of the soil gas remedy. In addition, Settling

Defendants shall continue weekly reporting via Weekly Updates through electronic mail. Should any significant repairs or deviations in operation occur, other than normal system shutdown for GAC change-out, Settling Defendants shall notify EPA within forty-eight (48) hours of the shutdown through correspondence or through a telephone call followed by written confirmation within five (5) days. GAC change-out shall be reported in the Weekly Update and summarized in the monthly and quarterly reports.

Settling Defendants shall submit Quarterly Soil Vapor Monitoring Reports forty-five (45) days after the end of each quarter. The Quarterly Soil Vapor Monitoring Reports shall include a description of SVE activity conducted during the previous quarter, including a summary of SVE monitoring data for that quarter, a chronological data summary of soil vapor analyses for all SVM wells periodically or no longer sampled, a chronological summary of the total mass of contaminants removed each month, a description of SVE activity planned for the next quarter, and a description of any problems encountered during SVE operation and how those problems have been or will be addressed. The Fourth Quarterly Report shall also provide a summary description of soil vapor investigation and monitoring activities conducted during the prior year, and any recommended changes or additions to the monitoring and extraction well network, including changes to the monitoring frequency for specific SVM wells.

Task 7.4 Operation and Maintenance of the SVE System

Until the 1998 O&M Plan for the SVE system operation is updated, Settling Defendants shall continue to operate and maintain the soil gas remedy as set forth in the SVE Workplan and its amendments and the EPA-approved O&M Plan (Task 7.2). Settling Defendants shall operate the existing SVE system during investigation of Site source areas (Tasks 5.0 and 10.0) and characterization of the full vertical and lateral extent of contamination (Tasks 8.0 and 9.0), unless otherwise directed by EPA.

Within forty-five (45) days after notification from EPA that a modification to the SVE system is necessary based on Settling Defendants' evaluation of new soil vapor data or other technical information, Settling Defendants shall prepare an SVE Modification Workplan. The SVE Modification Workplan shall describe and include plans and specifications for specific design and engineering modifications or upgrades to the existing SVE system, including a proposed schedule for implementing the proposed modifications. Within thirty (30) days of EPA approval of the SVE Modification Workplan, Settling Defendants shall initiate the modifications in accordance with the Workplan and schedule.

Summary of Task 7.0 Deliverables and Schedule

• Draft SVE O&M Plan	April 1, 2005
• Final SVE O&M Plan	30 days after receipt of EPA comments
• Draft SVE Modification Workplan	45 days after notification from EPA that modification of SVE system is necessary
• Final SVE Modification Workplan	30 days after receipt of EPA comments
• Initiate SVE Remedy Modification	30 days after EPA approval of Workplan
• Quarterly Soil Gas Reports	45 days after the end of the quarter

Task 8.0 Soil Gas Investigations

The objective of Task 8.0 is to characterize the vertical and lateral extent of soil gas contamination that poses a threat to groundwater or poses an unacceptable indoor or ambient air risk. The soil gas investigations shall be conducted in phases and, where applicable, the activities associated with the soil gas investigations (Task 8.0) may be conducted in conjunction with other source area investigations (Tasks 5.0 and Task 10.0).

Task 8.1 Review Soil Gas Information

Settling Defendants shall review all existing soil gas information, including data collected by EPA during 2003 from the existing SVM wells and exploratory boreholes, by Settling Defendants during implementation of the SVE System Pilot Study from April and May, 2004, and during subsequent operation of the SVE system. Settling Defendants shall review existing data and data collected as part of Tasks 5.0, 7.0, 9.0, and 10.0 in order to define the extent of soil gas contamination, to identify data gaps, and to identify data needed to define the extent of soil gas contamination in soils and vapor intrusion into buildings overlying contaminated groundwater and soil gas plumes.

Within thirty (30) days of EPA approval of the Final Main Drywells Source Area Investigation Report (Task 5.7), Settling Defendants shall hold a meeting with EPA and ADEQ to present an updated SCM describing the then-current understanding of how soil gas contamination is distributed vertically and laterally and to identify data needed to define the extent of soil gas contamination that poses a threat to groundwater, to ambient outdoor air and to indoor air.

Task 8.2 Soil Gas Investigation Workplan

Within sixty (60) days of EPA approval of the Final Main Drywells Source Area Investigation Report, Settling Defendants shall develop a Soil Gas Investigation Workplan that includes, but is not limited to, identification of the project team, the updated SCM, a description of the methodology to be used to estimate the mass of soil gas in the vadose zone, to characterize the vertical and lateral extent of soil gas contamination that poses a threat to groundwater, ambient air or indoor air, and to identify potential migration mechanisms, a description of data gaps to characterize the vertical and lateral extent of soil gas contamination, a description of other data requirements to support the soil gas models, a description of the soil gas investigation data quality objectives, an overview of soil gas investigation strategy, a description of the tasks associated with performing the soil gas investigations, and a schedule for performing the

investigation. The Soil Gas Investigation Workplan may be conducted in phases, filling data gaps as they are identified. The Soil Gas Investigation Workplan shall include installation of exploratory boreholes and permanent multi-tiered SVM wells, which at EPA's direction may include SVM wells at the facility boundary and adjacent to sensitive receptors, including, but not limited to, occupiable buildings. Additionally, the Soil Gas Investigation Workplan shall include quarterly monitoring of all SVM wells. The Soil Gas Investigation Workplan shall utilize the VLEACH model to assess whether soil gas contamination continues to pose a threat to groundwater.

The Soil Gas Investigation Workplan shall utilize the draft guidance for *Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (EPA OSWER, September 2002) ("*Vapor Intrusion Guidance*") to assess whether soil gas levels near occupiable buildings pose a threat to indoor air. In the event that soil gas levels near occupiable buildings are at levels warranting indoor air sampling pursuant to the *Vapor Intrusion Guidance*, Settling Defendants shall perform indoor air sampling as described in Task 9.0.

Additionally, the Soil Gas Investigation Workplan shall include development of a Soil Gas Investigation FSAP, QAPP, and an updated HASP, as necessary. The Soil Gas Investigations FSAP, QAPP, and updated HASP shall be developed in accordance with the requirements described in Task 2.3.

Task 8.3 Conduct Soil Gas Investigation Activities

Settling Defendants shall conduct the soil gas investigations in accordance with an EPA-approved Soil Gas Investigation Workplan, FSAP, QAPP, and HASP. Soil gas investigation activities shall begin no later than thirty (30) days after receiving EPA's approval of the Soil Gas Investigation Workplan, FSAP, and QAPP. Settling Defendants shall provide EPA with a Notification of Initiation of Field Work at least fifteen (15) days prior to initiating any physical

work in the field. The Notification of Initiation of Field Work must include the expected dates for field activities so that EPA may adequately schedule oversight tasks. Upon submission of the Notification of Initiation of Field Work, Settling Defendants shall provide Weekly Updates via electronic mail. The Weekly Updates may be included with reporting for other tasks required under this SOW. Settling Defendants will provide a written Notification of Completion of Field Work within five (5) days of completion of field work activities. Unless EPA disapproves the Notification of Completion of Field Work, Weekly Updates regarding the soil gas investigation may be discontinued upon Notification of Completion of Field Work.

If at any time EPA makes a written determination, based on an evaluation of Site-related information including but not limited to information collected pursuant to the Soil Gas Investigation Workplan and Task 10.0 (Source Areas, Soils and Facility Structures Remedial Investigation), and following a consultation with Settling Defendants, that additional data must be collected to meet the objectives of the Soil Gas Investigation Workplan, Settling Defendants shall submit to EPA for review and approval an amendment to the Soil Gas Investigation Workplan ("Soil Gas Investigation Workplan Amendment") within thirty (30) days of EPA's determination. The Soil Gas Investigation Workplan Amendment shall describe the objectives of additional investigations, the DQOs, overview of the investigation strategy, description of the tasks associated with performing the soil gas investigation, and a schedule for performing the additional investigation. In addition, Settling Defendants shall amend the FSAP, QAPP, and the HASP to the extent necessary. Settling Defendants shall submit a Final Soil Gas Investigation Workplan Amendment within thirty (30) days of receipt of EPA comments on the Draft Workplan. Within 30 days of EPA approval of the Final Soil Gas Investigation Workplan Amendment, Settling Defendants shall conduct the additional soil gas investigations pursuant to the Workplan Amendment.

Task 8.4 Soil Gas Investigation Report

Within ninety (90) days of submittal of the Notice of Completion of Field Work for the Soil Gas Investigation, Settling Defendants shall submit a Soil Gas Investigation Report. The Soil Gas Investigation Report shall include, but not be limited to, a description of the soil gas investigation objectives, a description of the field investigations conducted to meet the identified objectives, a description of the nature and extent of soil gas contamination based on the field investigations and modeling results, a description of the areas where remediation or further investigations are required based on threat to groundwater and indoor air, and a summary of all the data results.

Within thirty (30) days of receipt of EPA's comments on the Draft Soil Gas Investigation Report or within sixty (60) days of completion of the fieldwork required by the Soil Gas Investigation Workplan Amendment, whichever comes later, Settling Defendants shall submit to EPA for review and approval a Final Soil Gas Investigation Report that incorporates the results of the entire Soil Gas Investigation.

Consistent with Paragraph 13 of the CD, as an addendum to the Soil Gas Investigation Report, Settling Defendants may submit a petition requesting that EPA consider specific modifications to implementation of the existing remedy or fundamental changes to the remedy selected in the ROD. Such petition must include a description of the proposed modifications or remedy changes, a discussion of how the proposed modifications or changes may enhance or expedite Site cleanup, reduce cleanup costs, or provide other substantial benefit sufficient to justify the modifications or remedy changes, and all information and analyses supporting the proposed modifications or remedy changes.

Should EPA make a written determination pursuant to Paragraph 14 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-Related information, that a modification to the implementation of the remedy selected in the ROD is appropriate, Settling

Defendants shall, within thirty (30) days of EPA's determination, submit a Modification Workplan to EPA for review and approval. The Modification Workplan shall include a description of the technical basis for the proposed modification, a specific proposal for implementing the proposed modification, and a proposed schedule for implementing the modification. Upon approval of the Modification Workplan, Settling Defendants shall implement the proposed modification in accordance with the approved Modification Workplan and schedule.

Should EPA make a written determination pursuant to Paragraph 18 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-related information, that a fundamental change to the remedy selected in the ROD may be required, Settling Defendants shall initiate the SFS process as directed by EPA and consistent with Task 12.0 of this SOW.

Summary of Task 8.0 Deliverables and Schedule:

• Meeting regarding SCM and Soil Gas Investigation	30 days after EPA approval of Main Drywells Source Area Investigation Report
• Draft Soil Gas Investigation Workplan and Draft FSAP and QAPP	60 days after approval of the Main Drywells Source Area Investigation Report
• Final Soil Gas Investigation Workplan and Final FSAP, QAPP, and HASP	30 days after receipt of EPA comments
• Initiate Soil Gas Field Investigations	30 days after EPA approval of Soil Gas Investigation Workplan
• Draft Soil Gas Investigation Workplan Amendment	30 days after EPA written determination that an amendment is necessary
• Final Soil Gas Investigation Workplan Amendment	30 days after receipt of EPA comments
• Initiate additional field investigations	30 days after EPA approval of Final Soil

		Gas Investigation Workplan Amendment
•	Draft Soil Gas Investigation Report	90 days after submittal of the Notice of Completion of Field Work
•	Final Soil Gas Investigation Report	30 days after receipt of EPA comments

AIR

The purpose of activities outlined in the air component of this SOW is to determine whether Site-related contaminants pose a health risk, either though migration into ambient outdoor air or into occupiable buildings due to contaminant migration from Site-related groundwater contamination, from contaminated subsurface soils, or from soil gas plumes. Activities to address potential air contamination include the development of mitigation plans to reduce or eliminate vapor intrusion into structures where vapor intrusion poses a health risk. These activities may be conducted, where feasible, in conjunction with those activities conducted under the soil gas media component of this SOW (Tasks 7.0 and 8.0).

Task 9.0 Air Investigation

The objectives of Task 9.0 are to:

- determine whether Site-related contaminants are potentially entering buildings overlying the Site groundwater, soil, or soil gas contamination;
- determine whether Site-related contaminants, specifically VOCs, are present in ambient air outside of buildings overlying the Site groundwater or soil gas plumes at concentrations exceeding regional background and levels of concern;
- determine whether Site-related contaminants are entering overlying buildings at concentrations exceeding levels of concern; and
- where warranted based upon human health risks, identify and implement measures to minimize or eliminate vapor intrusion into occupiable buildings.

Task 9.1 Air Sampling Workplan

By September 30, 2004, Settling Defendants shall revise the *2003 Draft Air Sampling Workplan* (Geomatrix, 2003) to characterize indoor air quality. The Revised Air Sampling Workplan shall identify occupiable structures near levels of subsurface soil gas contamination or groundwater contamination that could impact indoor air quality. Based upon that identification, following the protocol provided in the *Vapor Intrusion Guidance*, the Air Sampling Workplan shall provide for collection of data of sufficient quality and quantity to conduct a preliminary indoor and ambient outdoor air risk assessment for those buildings. The Air Sampling Workplan shall provide for collection of sufficient data to complete a baseline risk assessment for indoor air in accordance with Task 11.0. Should the Air Sampling Workplan allow for representative sampling of individual buildings rather than ongoing monitoring of those buildings, the Workplan shall provide for a minimum of two seasonal sampling events (*i.e.*, a winter and a summer event) in order to determine whether there are seasonal impacts (*e.g.*, the winter "stack effect") on vapor intrusion. Settling Defendants shall submit a Final Air Investigation Workplan within thirty (30) days after receipt of EPA's comments on the Draft Workplan.

The Air Sampling Workplan shall include, as necessary, an amendment to the existing Site Indoor Air FSAP, QAPP, and HASP in accordance with Task 2.3.

Task 9.2 Conduct Air Investigations

Settling Defendants shall conduct indoor air investigations in accordance with the EPA-approved Final Revised Air Sampling Workplan, FSAP, and QAPP. Settling Defendants shall provide EPA with a Notification of Initiation of Field Work at least fifteen (15) days prior to initiating any physical work in the field. The Notification of Initiation of Field Work must include the expected dates for field activities so that EPA may adequately schedule oversight tasks. Upon submission of the Notification of Initiation of Field Work, Settling Defendants shall provide Weekly Updates via electronic mail. Settling Defendants shall provide a written

Notification of Completion of Field Work within five (5) days of completion of field work activities. Unless EPA disapproves of the Notification of Completion of Field Work, Weekly Updates regarding air investigation activities may be discontinued upon submittal of the Notification of Completion of Field Work.

If at any time EPA makes a written determination, following consultation with Settling Defendants, and based on an evaluation of Site-related information including but not limited to information collected pursuant to the Revised Air Sampling Workplan, that additional data must be collected to meet the objectives of the Revised Air Sampling Workplan, Settling Defendants shall submit to EPA for review and approval an amendment to the Revised Air Sampling Workplan ("Revised Air Sampling Workplan Amendment") within thirty (30) days of EPA's written determination. The Revised Air Sampling Workplan Amendment shall describe the objectives of additional investigations, the DQOs, overview of the investigation strategy, a description of the tasks associated with performing the air investigation, and a schedule for performing the additional investigation. In addition, Settling Defendants shall amend the FSAP, QAPP, and the HASP to the extent necessary. Settling Defendants shall submit a Final Revised Air Sampling Workplan Amendment within thirty (30) days of receipt of EPA comments on the Draft. Settling Defendants shall conduct the additional air investigations pursuant to the Revised Air Sampling Workplan Amendment.

Task 9.3 Air Investigation Report

Settling Defendants shall develop an Air Investigation Report that includes, but is not limited to, a description of the air investigation objectives, a description of the field investigations to meet the identified objectives, a description of the indoor air and ambient air investigation results, and an assessment of the human health risk from exposure to Site-related COCs in indoor and outdoor air. Any assessment of potential risk to building occupants from exposure to COCs through vapor intrusion shall be based upon results from at least two sampling

events representing seasonal variations in each building using standard and customary practice according to EPA's risk assessment policies and guidelines for the performance of risk assessments (*e.g.*, Risk Assessment Guidance for Superfund, Parts A through E), EPA Region IX PRGs, and the *Vapor Intrusion Guidance.*

Within thirty (30) days of receipt of EPA's comments on the Draft Air Investigation Report or within sixty (60) days of completion of the fieldwork required by the Air Sampling Workplan Amendment, whichever comes later, Settling Defendants shall submit to EPA for review and approval a Final Air Investigation Report that incorporates the results of the entire Air Investigation.

Consistent with Paragraph 13 of the CD, as an addendum to the Air Investigation Report, Settling Defendants may submit a petition requesting that EPA consider specific modifications to implementation of the existing remedy or fundamental changes to the remedy selected in the ROD. Such petition must include a description of the proposed modifications or remedy changes, a discussion of how the proposed modifications or changes may enhance or expedite Site cleanup, reduce cleanup costs, or provide other substantial benefit sufficient to justify the modifications or remedy changes, and all information and analyses supporting the proposed modifications or remedy changes.

Should EPA make a written determination pursuant to Paragraph 14 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-Related information, that a modification to the implementation of the remedy selected in the ROD is appropriate, Settling Defendants shall, within thirty (30) days of EPA's determination, submit a Modification Workplan to EPA for review and approval. The Modification Workplan shall include a description of the technical basis for the proposed modification, a specific proposal for implementing the proposed modification, and a proposed schedule for implementing the

modification. Upon approval of the Modification Workplan, Settling Defendants shall implement the proposed modification in accordance with the approved Modification Workplan and schedule.

Should EPA make a written determination pursuant to Paragraph 18 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-related information, that a fundamental change to the remedy selected in the ROD may be required, Settling Defendants shall initiate the SFS process consistent with Task 12.0 of this SOW.

Task 9.4 Implement Mitigation Measures

Should EPA make a written determination that the exposure to COCs in indoor air caused by vapor intrusion poses a human health risk warranting action, Settling Defendants shall provide an Indoor Air Exposure Mitigation Plan within thirty (30) days of EPA's determination. The Indoor Air Exposure Mitigation Plan shall provide for implementation of mitigation measures intended to reduce or eliminate vapor intrusion from the subsurface into overlying structures (*e.g.*, installation of a sub-slab depressurization system, expansion of the SVE system). The Indoor Air Exposure Mitigation Plan shall include proposed methods of mitigation, a description of how the mitigation methods are intended to function and will be assessed, and a schedule for implementation. Upon approval by EPA, Settling Defendants shall implement the Indoor Air Exposure Mitigation Plan according the schedule provided.

Summary of Task 9.0 Deliverables and Schedule:

• Revised Draft Air Sampling Workplan	September 30, 2004
• Final Air Sampling Workplan	30 days after receipt of EPA comments
• Conduct Winter Air Sampling Event	January 2005
• Draft Air Sampling Workplan Amendment	30 days after EPA written determination that an Amendment is necessary

• Final Air Sampling Workplan Amendment	30 days after receipt of EPA comments
• Initiate Additional Air Investigation	30 days after EPA approval of Final Air Sampling Workplan Amendment
• Draft Air Investigation Report	30 days after receipt of QA/QC final data
• Final Air Investigation Report	30 days after receipt of EPA comments
• Draft Indoor Air Exposure Mitigation Plan	30 days after EPA written determination
• Final Indoor Air Exposure Mitigation Plan	30 days after receipt of EPA comments
• Implement Indoor Air Mitigation Measures	Pursuant to schedule in Indoor Air Exposure Mitigation Plan

SOURCE AREAS, SOILS (SURFACE AND SUBSURFACE), AND FACILITY STRUCTURES

The purpose of the source areas, soils (surface and subsurface), and facility structures component of this SOW is to characterize the soils and other structural elements at and in the vicinity of the Unidynamics facility where contamination may be present. The activities in this section of the SOW include characterizing the nature and extent of contamination, including but not limited to explosives wastes in soils and within the facility infrastructure, buildings and bunkers, assessing potential human health and ecological risk, and identifying active source areas that may require characterization and remediation. Elements of these activities may be conducted, where feasible, in conjunction with those activities related to the investigation of potential source areas for other media components (Tasks 5.0 and 8.0).

Task 10.0 Source Areas, Soils, and Facility Structures Remedial Investigation

The objectives of Task 10.0 are to:

- review historical records and data to assess historical operations, waste management and storage methods, and methods of disposal;
- characterize the nature and extent of contamination, including explosives wastes, in soils

and within the facility infrastructure, buildings, and bunkers;

- identify and characterize areas of the Unidynamics facility that may be potential active sources of groundwater, soil, or soil vapor contamination in subsurface soils and groundwater to the extent that such areas are not being investigated as part of Tasks 5.0 and 8.0;
- assess the human health and ecological risks associated with the extent of contamination; and
- document investigative findings in a Source Areas, Soils, and Facility Structures Investigation Report.

Task 10.1 Site Evaluation and Data Compilation

Settling Defendants shall conduct historical research regarding the Unidynamics facility to develop a conceptual understanding of the facility's operations, chemical uses, waste management, storage and disposal methods, and potential migration pathways. Such information will be used to determine the scope of investigation activities necessary to characterize the extent of contamination in surface and subsurface soils and within the facility infrastructure, buildings and bunkers, to determine potential applicable or relevant and appropriate regulations ("ARARs") for cleanup of contamination, and to propose a range of preliminary response alternatives. Relevant historical information includes, but is not limited to, Site records and regulatory documents regarding the types of chemicals used at the facility; where and how chemicals and wastes were stored, transported and disposed of; location of sewerage and waste lines; and any other information identifying areas where contaminant releases may have occurred at the Unidynamics facility. Settling Defendants shall research and review existing soil analytical data, SWMU reports, Resource Conservation and Recovery Act ("RCRA") reports and records, including transportation manifests, facility engineering drawings and blueprints, facility contracts, and planning documents used during periods of facility expansion and construction.

Additional information shall include infrastructure maps and documents that identify and describe activities associated with buildings, bunkers, SWMUs, and areas used for chemical and explosives storage, chemical and explosives waste management, chemical and explosives waste treatment, and chemical and explosives research. Research efforts shall also include interviews with former employees, facility-specific survey work, and compilation and development of maps, where necessary, to document the varieties and quantities of hazardous substances and explosives materials used and disposed of at the facility. Settling Defendants shall refer to EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies (RI/FS) Under CERCLA*, OSWER Directive 9355.3-01 (EPA OSWER, October 1988) ("EPA RI/FS Guidance") for a comprehensive list of data collection information sources.

By August 1, 2005, Settling Defendants shall submit a Draft Site Evaluation Report that includes results from the research described in the previous paragraph, information required by EPA in letters dated April 5, 2001, and July 14, 2004, information from the updated Draft Site Briefing Package (Geomatrix, May 2002), and information gathered pursuant to Task 5.1.

The Site Evaluation Report shall contain: (1) a background section including, but not limited to, a description of the facility's geographic location, and, to the extent possible, the Site's physiography, hydrology, geology, demographics, ecological, cultural and natural resource features; (2) a narrative of the historical research completed; (3) maps, figures, photographs and other visual means of depicting all existing buildings and other facility features of interest to present the layout, locations, and uses of Unidynamics' facility features; (4) descriptions of the configuration, operation, and historical uses of the potential source areas at the Unidynamics facility; (5) identification of potential source areas (*e.g.*, soil contamination, SWMUs, leaking sumps, dry wells, soil gas, DNAPL in subsurface soils), COCs associated with each potential source, and recommendations for investigation thereof; (6) a summary of the existing data in

terms of physical and chemical characteristics of the contaminants identified and their distribution in the environmental media at the facility; and (7) the preliminary SCM identifying the fate and transport of each contaminant through each medium and any known or potential human or environmental receptors.

Within thirty (30) days of receipt of EPA comments on the Draft Site Evaluation Report, Settling Defendants shall submit a Final Site Evaluation Report. Within 30 days of EPA approval of the Final Site Evaluation Report, a meeting shall be held with EPA and ADEQ to present the potential sources and the preliminary SCM and to identify data gaps before submittal of the Source Areas, Soils, and Facility Structures Investigation ("Source Areas Investigation") Workplan (Task 10.2). To assist in planning the scope of the Source Areas Investigation, Settling Defendants shall also conduct a facility visit for EPA and ADEQ.

Task 10.2 Source Areas, Soils and Facility Structures Investigation Workplan

Within sixty (60) days EPA approval of the Final Site Evaluation Report, Settling Defendants shall submit a Source Areas Investigation Workplan including identification of preliminary remedial action objectives ("RAOs") (Task 10.2.1) and preliminary identification of ARARs (Task 10.2.2).

Task 10.2.1 Identification of Preliminary Remedial Action Objectives

Settling Defendants shall identify preliminary RAOs and potential remedial action alternatives and associated technologies for each known or potentially contaminated medium. The range of potential alternatives shall encompass, where appropriate, alternatives in which treatment significantly reduces the toxicity, mobility, or volume of the waste, alternatives that involve containment with little or no treatment, and a no-action alternative.

Task 10.2.2 Preliminary Identification of Potential ARARs.

Settling Defendants shall identify potential federal and state ARARs that apply to the Site location, to all potential COCs, and to all potential remedial alternatives.

Task 10.2.3 Source Areas, Soils and Facility Structures Investigation Workplan

The Source Areas Investigation Workplan shall provide an overview of the investigation strategy, a description of the tasks associated with performing the investigation, including any treatability studies, and an investigation schedule. The Source Areas Investigation Workplan shall identify the project team, describe investigation methodologies, describe information necessary to characterize the vertical and lateral extent of contamination, describe other data requirements to support any investigation methods used, and describe the DQOs for the investigation. Refer to Appendix B of *EPA RI/FS Guidance* for a comprehensive description of the contents of a Source Areas Investigation Workplan.

The Source Areas Investigation Workplan shall include a detailed description of each activity, information necessary to conduct each activity, information related to each activity necessary to conduct a baseline risk assessment (Task 10.8) and a Screening Level Ecological Risk Assessment ("SLERA") (Task 10.9), and information expected to be produced through each activity. Additionally, the Source Areas Investigation Workplan also shall include a project management plan, including a data management plan, as described in Task 15.0.

The Source Areas Investigation Workplan shall include, but not be limited to, the following:

- description of methods for identifying COCs, types of contamination and affected media, including within the Main Drywells Source Area;
- identification of any known or suspected sources of COCs, including within the Main Drywells Source Area;
- description of physical and biological characteristics of the Unidynamics facility;

- inventory of all structures on facility, including a description of past use and current conditions;
- characterization and assessment of the physical and chemical hazards associated with each of the structures on the Unidynamics facility;
- analysis of the fate and transport of each contaminant in each medium;
- identification of any known or potential human or environmental receptors;
- identification of contamination sources, including a description of the location and boundaries (areal extent and vertical depth) of each potential source of contamination, its physical characteristics, chemical constituents, and concentrations, based on sufficient sampling to the detection levels established in the DQOs identified in the QAPP;
- description of the nature and extent of contamination associated with each potential point-source and non-point source at the Unidynamics facility;
- identification of the extent of contaminant migration via surface and subsurface pathways, including the identification of migration pathways, as well as any changes in each contaminant's physical or chemical characteristics;
- description of the contaminant fate and transport from the surface and subsurface soils and SWMUs, including waste lines, into the unsaturated vadose zone via migration, leaching, or volatilization, and into the ambient air via fugitive dust or volatilization;
- physical hazards posed by soils contamination or facility structures; and
- risks to human health and the environment .

The Source Areas Investigation Workplan also shall include, but not be limited to, development and implementation of the following: ecological field surveys, a facility sampling grid, installation of exploratory boreholes, initiation of sampling, installation and calibration of monitoring equipment, completion of treatability studies and other field tests, data analysis, and excavation of materials and soils. The Source Areas Investigation Workplan shall describe how facility structure, including, but not limited to, buildings, bunkers, and infrastructure units, such

as SWMUs and sewerage waste lines, will be investigated prior to and during demolition of any structures that may occur during the process of the investigation. The Source Areas Investigation Workplan shall address contamination in the Main Drywells Source Area as well as all areas described herein. Additionally, the Source Areas Investigation Workplan shall include development of a Source Areas Investigation FSAP, QAPP, and HASP (Task 10.3).

Task 10.3 Source Areas FSAP, QAPP, and HASP

An FSAP and QAPP shall be developed or existing plans shall be amended and incorporated into the Source Areas Investigation Workplan to address activities described in that Workplan (Task 10.2).

Settling Defendants shall use quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance and monitoring samples in accordance with *EPA Requirements for Quality Assurance Project Plans* (QA/R5) (EPA/240/B-01/003, March 2001), *A Guidance for Quality Assurance Project Plans* (QA/G-5) (EPA/600/R-98/018, February 1998), and subsequent amendments thereto upon notification by EPA to Settling Defendants of such amendments.

Settling Defendants shall ensure that the laboratories utilized for the analysis of samples taken pursuant to this SOW perform all analyses according to accepted EPA methods and pursuant to the QAPP for quality assurance monitoring. Accepted EPA methods consist of those methods which are documented in *A Contract Lab Program Statement of Work for Inorganic Analysis*, ILM05.3 (February 2004) and *A Contract Lab Program Statement of Work for Organic Analysis*, OLMO4.3 (August 2003), and any amendments made thereto during the course of the implementation of this SOW. Settling Defendants may use other analytical methods that are at least as stringent as the CLP-approved methods only after opportunity for review and comment by ADEQ and approval by EPA. Settling Defendants shall ensure that all laboratories that are

used for analysis of samples taken pursuant to this CD participate in an EPA or EPA-equivalent QA/QC program. Settling Defendants shall only use laboratories that have a documented Quality System that complies with Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs, ANSI/ASQC E4-1994 (American National Standard, January 5, 1995), and *EPA Requirements for Quality Management Plans* (QA/R-2) (EPA/240/B-01/002, March 2001), or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the NELAP as meeting the Quality System requirements. Settling Defendants shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this SOW are conducted in accordance with the procedures set forth in the EPA-approved QAPP.

Settling Defendants shall submit to EPA a HASP for all field investigation activities that conforms to the applicable OSHA standards and EPA requirements, including but not limited to 29 C.F.R. § 1910.120.

Task 10.4 Conduct Source Areas, Soils and Facility Structures Investigation

Within thirty (30) days of EPA approval of the Source Areas Investigation Workplan, Settling Defendants shall initiate the Source Areas Investigation in accordance with the Workplan (Task 10.2), the FSAP, QAPP, and HASP (Task 10.3). Settling Defendants shall notify EPA with a Notification of Initiation of Field Work at least fifteen (15) days prior to initiating any physical work in the field. Upon submission of the Notification of Initiation of Field Work, Settling Defendants shall provide Weekly Updates via electronic mail. The Notification of Initiation of Field Work must include the expected dates for field activities so that EPA may adequately schedule oversight tasks. Settling Defendants shall provide a written Notification of Completion of Field Work within five (5) days of completion of field work activities. Unless EPA disapproves the Notification of Completion of Field Work, Weekly Updates regarding the Source Areas Investigation may be discontinued upon Notification of

Completion of Field Work.

If at any time EPA makes a written determination, based on an evaluation of Site-related information including but not limited to information collected pursuant to the Source Areas Investigation Workplan, that additional data must be collected to meet the objectives of the Source Areas Investigation Workplan, Settling Defendants shall submit to EPA for review and approval an amendment to the Source Areas Investigation Workplan ("Source Areas Investigation Workplan Amendment") within thirty (30) days of EPA's written determination. The Source Areas Investigation Workplan Amendment shall describe the objectives of additional investigations, the DQOs, overview of the investigation strategy, description of the tasks associated with performing the Source Areas Investigation, and a schedule for performing the additional investigation. In addition, Settling Defendants shall amend the FSAP, QAPP, and HASP to the extent necessary. Settling Defendants shall submit a Final Source Areas Investigation Workplan Amendment within thirty (30) days of receipt of EPA comments on the Draft. Settling Defendants shall conduct the additional Source Areas Investigation pursuant to the Source Areas Investigation Workplan Amendment.

Task 10.5 Treatability Studies

Should EPA make a written determination that alternative treatment technologies may enhance Site remediation, within thirty (30) days Settling Defendants shall submit a Draft Treatability Study Workplan and proposed schedule for EPA review and approval. Within thirty (30) days of receipt of EPA comments on the Draft Treatability Study Workplan, Settling Defendants shall submit a Final Treatability Study Workplan addressing EPA comments. Upon approval of the Final Treatability Study Workplan, Settling Defendants shall initiate implementation of the Workplan in accordance with the approved schedule and the Source Areas FSAP and QAPP, as described under Task 10.3. All treatability studies shall be conducted in accordance with EPA's Treatability Study Guidance. Settling Defendants should plan to conduct

initial treatability testing activities, such as research and study design, concurrent with the Source Areas Investigation. Settling Defendants shall take into consideration and incorporate, as appropriate, activities or findings from treatability studies conducted in Task 5.5.

Task 10.6 Source Areas, Soils and Facility Structures Investigation Support Activities

Settling Defendants shall notify EPA at least fifteen (15) days in advance of any field support activities in order to allow EPA to provide oversight of those activities. Field support activities include, but are not be limited to, obtaining access to private and public properties where investigative activities are to be conducted, scheduling activities, and procurement of field equipment, office space, laboratory services, and contractors.

Task 10.7 Removal Actions

Should EPA make a written determination, through a Removal Action Memorandum ("Action Memorandum"), during the implementation of the Main Drywells Area Investigation or the Source Areas Investigation Workplan that contaminants identified at the Site pose an imminent and substantial risk to human health and the environment, Settling Defendants shall conduct a the activities selected in the Action Memorandum to abate that risk. Based upon the risk level assessed in a Action Memorandum, within thirty (30) days of issuance of the Action Memorandum, Settling Defendants shall provide to EPA for review and approval a Removal Action Workplan to conduct either a time-critical or non-time critical removal action as provided in the Action Memorandum in accordance with the schedule set forth therein. Within thirty (30) days of receipt of EPA's comments on the Draft Removal Action Workplan, Settling Defendants shall submit a Final Removal Action Workplan and initiate work pursuant to the workplan and the schedule therein. Should the Action Memorandum indicate that, in order to protect human health and the environment, work must be commenced on a more expedited schedule, Settling Defendants shall provide the Draft Removal Action Workplan and Final Removal Action Workplan on the expedited schedule provided by EPA.

Task 10.8 Source Areas, Soils and Facility Structures Baseline Risk Assessment

Within ninety (90) days after EPA approval of the Preliminary Source Areas Summary Report and at the same time as the Source Areas Remedial Investigation ("RI") Report (Task 10.11), Settling Defendants shall submit as a separate deliverable a Source Areas Baseline Risk Assessment for the source areas, soils, and facility structures as detailed in Tasks 11.1. Within thirty (30) days of EPA approval of the Preliminary Source Areas Summary Report, Settling Defendants shall meet with EPA and ADEQ to discuss data gaps identified during the Source Areas Investigation that are needed to complete the Source Areas Baseline Risk Assessment.

Task 10.9 Screening Level Ecological Risk Assessment

Within ninety (90) days after EPA approval of the Preliminary Source Areas Summary Report and at the same time as the Source Areas RI Report (Task 10.11), Settling Defendants shall conduct a SLERA, as detailed in Task 11.2, analyzing whether Site-related contaminants pose a current or potential risk to the environment in the absence of any remedial action.

Task 10.10 Source Areas, Soils and Facilities Structures Investigation Summary

Within thirty (30) days of submittal of the Notice of Completion of Field Work, Settling Defendants shall submit for EPA review and approval a Preliminary Source Areas Investigation Summary Report that summarizes the results of the Source Areas Investigation, the status of the baseline risk assessment and the SLERA process, the development and screening of remedial alternatives, the identification of potential ARARs, and any proposal for modification or change of the existing Site remedy.

Should EPA make a written determination that additional data are required to determine the full extent of contamination in the source areas, soils, and facility structures, Settling Defendants shall amend the Source Areas Investigation Workplan ("Source Areas Investigation Workplan Amendment") to reflect the tasks necessary to gather the additional data. The Source

Areas Investigation Workplan Amendment shall describe the objectives of additional investigations, DQOs, overview of the investigation strategy, description of the tasks associated with performing the investigation, and a schedule for performing the investigation. In addition, Settling Defendants shall amend the FSAP, QAPP, and HASP, as necessary, to address the additional investigations. Following completion of tasks required by the Source Areas Investigation Workplan Amendment, Settling Defendants shall incorporate that data into a Source Areas Investigation Report Amendment that summarizes the purpose and results of additional source areas, soils, and facility structures investigations.

Should the Source Areas Investigation Summary identify contamination, including VOCs, explosives, or inorganic contamination, that pose a threat to human health and the environment, that can be addressed pursuant to the current Site ROD, Settling Defendants shall address the threat through implementation of SVE in accordance with Task 7.0 or through excavation as detailed in the next paragraph.

Should EPA make a written determination that contamination identified during the Source Areas Investigation can be effectively remediated by excavation, within thirty (30) days of that determination, Settling Defendants shall submit for EPA review and approval an Excavation Response Workplan that includes the information detailed in Task 13.2. The Excavation Response Workplan shall describe the volume of material to be excavated, the chemical and physical characteristics of the material, the hazardous waste characteristics of the material according to 40 C.F.R. § 262.11, the ARARs pertaining to the material, and the hauling and disposal plan for the materials. Following EPA approval of the Excavation Response Workplan, Settling Defendants shall excavate materials in accordance therewith.

Task 10.11 Source Areas, Soils and Facility Structures Remedial Investigation Report

Settling Defendants shall submit, within sixty (60) days after EPA Approval of

Preliminary Source Areas Summary Report or sixty (60) days of completion of field work required by a Source Areas Investigation Workplan Amendment, a Source Areas RI Report that includes, but is not limited to, a description of the source areas, soils, and facility structures investigation objectives, a description of the field investigations to meet the identified objectives, an updated SCM, a description of the nature and extent of the source areas, and a description of the relative significance of the source areas, including soils and facility structures, based on vertical and lateral extent, COC concentrations, total mass of contamination, dissolution rates, and the hydrogeology in the vicinity of the source areas. The Source Areas RI Report shall also present the results of any treatability studies conducted as part of the Source Areas Investigation, including a description of the treatability study objectives, the parameters used to evaluate the success of the treatability study, the treatability study results, and the treatability study conclusions. Finally, the Source Areas RI Report shall include a summary of all the data results, including original analytical reports, recommendations for additional phases of investigation where all the data gaps are not filled, and remedial action objectives for remediation of source areas, soils, and facility structures where such remedies are not already included in the ROD.

Within thirty (30) days of receipt of EPA's comments on the Draft Source Areas RI Report or within sixty (60) days of completion of the fieldwork required by the Source Areas Investigation Workplan Amendment, whichever comes later, Settling Defendants shall submit to EPA for review and approval a Final Source Areas RI Report that incorporates the results of the entire Source Areas Investigation.

Consistent with Paragraph 13 of the CD, as an addendum to the Source Areas RI Report, Settling Defendents may submit a petition requesting that EPA consider specific modifications to implementation of the existing remedy or fundamental changes to the remedy selected in the ROD. Such petition must include a description of the proposed modifications or remedy changes, a discussion of how the proposed modifications or changes may enhance or expedite

Site cleanup, reduce cleanup costs, or provide other substantial benefit sufficient to justify the modifications or remedy changes, and all information and analyses supporting the proposed modifications or remedy changes.

Should EPA make a written determination pursuant to Paragraph 14 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-related information, that a modification to the implementation of the remedy selected in the ROD is appropriate, Settling Defendants shall, within thirty (30) days of EPA's determination, submit a Modification Workplan to EPA for review and approval. The Modification Workplan shall include a description of the technical basis for the proposed modification, a specific proposal for implementing the proposed modification, and a proposed schedule for implementing the modification. Upon approval of the Modification Workplan, Settling Defendants shall implement the proposed modification in accordance with the approved Modification Workplan and schedule.

Should EPA make a written determination pursuant to Paragraph 15 of the CD, based on Settling Defendants' petition or on an independent evaluation of Site-related information, that a fundamental change to the remedy selected in the ROD may be required, Settling Defendants shall initiate the SFS process consistent with Task 12.0 of this SOW.

Summary of Task 10.0 Deliverables and Schedule

• Draft Site Evaluation Report	August 1, 2005
• Final Site Evaluation Report	30 days after receipt of EPA comments
• Meeting regarding SCM and Source Areas, Soils, and Facility Structures Investigation	30 days after EPA approval of Final Site Evaluation Report
• Draft Source Areas Investigation Workplan, Draft FSAP and QAPP, and Final HASP	60 days after approval of Final Site Evaluation Report

• Final Source Areas Investigation Workplan, and Final FSAP and QAPP	30 days after receipt of EPA comments
• Initiate Field Investigation Activities	30 days after EPA approval of Sources Areas Investigation Workplan
• Draft Treatabilty Study Workplan	30 days after EPA written determination that treatability study is necessary
• Final Treatability Study Workplan	30 days after receipt of EPA comments
• Initiate Treatability Studies	30 days after EPA approval of Final Treatability Study Workplan
• Draft Preliminary Source Areas, Soils, and Structures Summary Report	30 days after submittal of Notice of Completion of Field Work
• Final Preliminary Source Areas, Soils, and Structures Summary Report	30 days after receipt of EPA comments
• Meeting Regarding Risk Assessment, Data Gaps, and Process	30 days after EPA approval of Preliminary Source Areas Summary Report
• Draft Source Areas Investigation Workplan Amendment	30 days after EPA written determination that additional investigation is necessary
• Final Source Areas Investigation Workplan Amendment	30 days after receipt of EPA comments
• Initiate Additional Field Investigations	30 days after EPA approval of Source Areas Investigation Workplan Amendment
• Draft Excavation Response Workplan	30 days after EPA determination that excavation is necessary
• Final Excavation Response Workplan	30 days after receipt of EPA comments
• Draft Source Areas RI Report	60 days after EPA Approval of Preliminary Source Areas Summary Report or 60 days after completion of field work required by

		Workplan Amendment
•	Final Source Areas RI Report	30 days after receipt of EPA comments

Task 11.0 Human Health and Ecological Risk Assessment

The objectives of Task 11.0 are to:

- characterize human health risks potentially associated with the Site to determine whether remediation is necessary to mitigate significant risks to public health; and
- characterize ecological risks associated with the Site to determine whether remediation is necessary to mitigate significant risks to ecological receptors.

Task 11.1 Baseline Human Health Risk Assessment Amendment

Within ninety (90) days after finalization of Tasks 1.0, 2.7, 5.7, 7.2, 8.4, 9.3, and 10.11, whichever is finalized last, Settling Defendants shall submit a Site-Wide Risk Assessment Amendment ("Risk Assessment Amendment"), updating and supplementing the risk assessment contained in the *Phoenix-Goodyear Airport Remedial Investigation/Feasibility Study Volumes I through VI* (CH2M Hill, June 1989) ("1989 Risk Assessment") and incorporating the Source Areas Baseline Risk Assessment. The Risk Assessment Amendment shall address all media areas, exposure pathways, contaminants, and health risks not addressed in the 1989 Risk Assessment.

The Risk Assessment Amendment shall be prepared in accordance with the following guidance documents:

- *Risk Assessment Guidance for Superfund - Volume I Human Health Evaluation Manual, Interim Final,* EPA-540-1-89-002 *(Part A)* (EPA OERR, December 1989);
- *A Risk Assessment Guidance for Superfund - Volume I Human Health Evaluation Manual,* Interim, Publications 9285.7-01B and -01C *(Part B, Development of Risk-based Preliminary Remediation Goals; Part C, Risk Evaluation of Remedial Alternatives*) (EPA

OERR, December 1991);

- *Guidance for Data Usability in Risk Assessment*, EPA-540-G-90-008 (EPA, October 1990);
- *Revised Policy on Performance of Risk Assessments During Remedial Investigation/Feasibility Studies (RI/FS) Conducted by Potentially Responsible Parties,* OSWER Directive No. 9835.15c (EPA OSWER, January 1996); and
- *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, OSWER Directive No. 9355.0-30 (EPA OSWER, April 22, 1991).

The Risk Assessment Amendment shall be prepared based on information and data developed through the field investigations and data analysis performed as part of Tasks 2.0 - 10.0. The Risk Assessment Amendment shall also include, but not be limited to, a discussion of the potential COCs, exposure pathways of concern, the toxicity characteristics for potential COCs, and the potentially impacted media. The Risk Assessment Amendment shall include multiple descriptors of risk and supporting qualitative information to characterize health risks potentially associated with the Site. The Risk Assessment Amendment shall include an Exposure Assessment (Task 11.1), Toxicity Assessment (Task 11.2), and a Risk Characterization (Task 11.3).

Task 11.1.1 Exposure Assessment

Settling Defendants shall develop an Exposure Assessment that describes potentially exposed populations, identifies and evaluates exposure pathways from Site-specific COCs to exposed populations, estimates exposure concentrations at points of exposure using environmental fate and transport modeling, and estimates intake rates in humans from inhalation and ingestion exposure. Settling Defendants shall develop exposure scenarios for the Risk Assessment Amendment in collaboration with EPA that are based upon land use assumptions for both current and possible future uses of the Site. The exposure scenarios shall define the sources of chemical release into the environment, identify potentially exposed populations, frequencies,

and duration of potential exposure, and identify possible exposure pathways through which populations could come into contact with the released chemicals.

Task 11.1.2 Toxicity Assessment

Settling Defendants shall develop a Toxicity Assessment that provides numerical indicators of toxicity that will be used to characterize health risks and identifies and selects cancer risk slope factors and reference doses ("RfDs") from sources cited in EPA Region IX PRG Tables (http://www.epa.gov/region09/waste/sfund/prg/), including, but not limited to, the Integrated Risk Information System ("IRIS"), Health Effects Assessment Summary Tables ("HEAST"), Health Effects Assessment documents ("HEAs"), California-EPA, and ATSDR.

Task 11.1.3 Risk Characterization

Settling Defendants shall develop a Risk Characterization of health risks combining the results of the Toxicity Assessment and Exposure Assessments to provide numerical estimates of health risk. The health risk estimates shall compare exposure levels with appropriate RfDs or estimates of the lifetime cancer risk associated with a particular chemical intake rate. The Risk Characterization shall present multiple descriptors of risk and supporting qualitative information to characterize potential health risks associated with the facility. Three risk descriptors shall be presented in the risk assessment: 1) Central Tendency Risk (average or median risk); 2) High-End Risk (risk at the 90th percentile of the risk distribution); and 3) the Reasonable Maximum Exposure. The Risk Characterization shall include summary tables of the Risk Assessment Amendment results. Settling Defendants shall address the nature and weight of evidence supporting the risk estimates and the magnitude of uncertainty surrounding the estimates.

Task 11.1.4 Risk Assessment Amendment

Settling Defendants shall submit a Risk Assessment Amendment that includes the Exposure Assessment (Task 11.1), Toxicity Assessment (Task 11.2), and Risk Characterization

(Task 11.3) within sixty (60) days after completion of the Groundwater Investigation Report (Task 2.7), Main Drywells Area Investigation Report (Task 5.7), Soil Gas Investigation Report (Task 8.4), Air Investigation Report (Task 9.3), and Source Areas Investigation Report (Task 10.11), whichever is finalized last. Settling Defendants shall submit a Final Risk Assessment Amendment within thirty (30) days after receipt of EPA's comments on the Draft Report.

11.2 Screening Level Ecological Risk Assessment

Within ninety (90) days after finalization of Tasks 1.0, 2.7, 5.7, 7.2, 8.4, 9.3, and 10.11, whichever is finalized last, Settling Defendants shall conduct a SLERA for the Site. The SLERA will determine whether Site-related contaminants pose a current or potential risk to the environment in the absence of any remedial action. Settling Defendant shall address the contaminant identification, exposure assessment, toxicity assessment, and risk characterization. The SLERA will be used to determine whether remediation is necessary at the Site to mitigate significant risks to ecological receptors, provide justification for performing remedial action, and determine which exposure pathways need to be remediated.

Settling Defendant shall prepare a SLERA in accordance with EPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final*, EPA 540-R-97-006 (EPA OSWER, 1997). The SLERA shall include the following:

- Hazard Identification (sources). The SLERA shall review available information on the hazardous substances present at the Site and identify Site-related COCs.
- Dose-Response Assessment. COCs should be selected based on their intrinsic toxicological properties.
- Conceptual Exposure/Pathway Analysis. Critical exposure pathways (e.g., surface soil) shall be identified and analyzed. The proximity of contaminants to exposure pathways and their potential to migrate into critical exposure pathways shall be assessed.

- Characterization of Site and Potential Receptors. The SLERA shall identify and characterize environmental exposure pathways.
- Select Chemicals, Indicator Species, and End Points. In preparing the SLERA, Settling Defendants shall select representative chemicals, indicator species (species that are especially sensitive to environmental contaminants), and end points on which to focus the assessment.
- Exposure Assessment. The exposure assessment will identify the magnitude of actual or environmental exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment will be based on the maximum levels of site contamination or the levels predicted through environmental fate and transport modeling, as appropriate for the selected potential receptors.
- Toxicity Assessment and Risk Characterization. The toxicity assessment will address the predicted magnitude of adverse environmental effects associated with chemical exposures through comparison to conservative literature-based eco-toxicological benchmarks. Through these comparisons, the Risk Characterization shall determine whether concentrations of contaminants at or near the Site are affecting or could potentially affect the environment.

Summary of Task 11.0 Deliverables

• Draft Baseline Human Health Risk Assessment Amendment	90 days after finalization Tasks 1.0, 2.7, 5.7, 7.2, 8.4, 9.3, and 10.11, whichever is last
• Final Baseline Human Health Risk Assessment Amendment	30 days after receipt of EPA comments
• Draft Screening-Level Ecological Risk Assessment	60 days after finalization of Tasks 1.0, 5.7, 7.2, 8.4, 9.3, and 10.11, whichever is last
• Final Screening-Level Ecological Risk Assessment	30 days after receipt of EPA comments

Task 12.0 Supplemental Feasibility Study

The objective of the SFS is to evaluate additional or alternate remedial alternatives where investigation indicates that fundamental changes to the Site remedy selected in the ROD may be appropriate to achieve or augment remediation of Site contamination. Should EPA make a written determination pursuant to Paragraph 18 of the CD, based on a petition submitted by Settling Defendants pursuant to Tasks 1.0, 2.7, 5.7, 6.2, 7.2, 8.4, 9.3, or 10.11 or on an independent evaluation of Site-related information, that a fundamental change to any part of the remedy selected in the ROD may be required, Settling Defendants shall develop one or more SFS(s) to evaluate remedial alternatives to accomplish such changes in accordance with the NCP.

Task 12.1 Develop, Screen, and Perform a Detailed Analysis of Remedial Alternatives

Should EPA make a written determination pursuant to Paragraph 18 of the CD, based on a petition submitted by Settling Defendants pursuant to Tasks 1.0, 2.7, 5.7, 6.2, 7.2, 8.4, 9.3, or 10.11 or on an independent evaluation of Site-related information, that a fundamental change to any part of the remedy selected in the ROD may be required, Settling Defendants shall submit for EPA review and approval a Remedial Alternatives Screening Summary within sixty (60) days after EPA's determination. The Remedial Alternatives Screening Summary shall describe a full range of remedial alternatives to remediate or augment remediation of contaminated media and to address exposures to Site contamination. The Remedial Alternatives Screening Summary shall include details regarding the proposed alternatives as well as the criteria to be used to screen those treatment alternatives.

Any potential fundamental change to the existing remedy shall meet the following overall Site cleanup objectives:

- capture and treatment of the extent of Site-related contamination;
- restoration of the aquifers and soil contaminated by Site-related COCs to levels below Site-specific cleanup and performance levels;

- remediation of active sources of Site contamination; and
- mitigation of exposure to contamination in groundwater, soil gas, and ambient and indoor air.

The Remedial Alternatives Screening Summary shall identify and generally describe potential treatment technologies, considering whether each remedial option will reduce the toxicity, mobility, or volume of wastes, whether each remedial option will use treatment, containment and off-site disposal exclusively, or a combination of the components, and a no-action alternative. For each alternative option, Settling Defendants shall present both engineering components and non-engineering, institutional controls to be considered should the option leave waste in place above Site-specific Performance Levels during and/or after remedial action has been taken. As described in the EPA RI/FS Guidance, the Remedial Alternatives Screening Summary shall describe how remedial alternatives have been screened according to effectiveness, implementability, and cost to determine whether an alternative should undergo a more thorough and extensive analysis. The Remedial Alternatives Screening Summary shall identify all treatability studies that have been or will be conducted to support any remedial alternatives.

The Remedial Alternatives Screening Summary shall be submitted to EPA for comments. Within forty-five (45) days of EPA's comments, Settling Defendants shall revise the Remedial Alternatives Screening Summary accordingly and incorporate it into the SFS Report (Task 12.3). Settling Defendants shall analyze in detail each of the remedial alternatives that EPA identifies for further evaluation from the Remedial Alternatives Screening Summary.

Task 12.2 Identify ARARs

Any fundamental changes to the existing remedy shall comply with the ARARs identified in the ROD. Settling Defendants shall identify any potential new ARARs or proposed

changes to existing ARARs that pertain to any fundamental changes to the existing remedy for groundwater or soil gas in the SFS Report (Task 12.3).

Task 12.3 Supplemental Feasibility Study Report

Within sixty (60) days of EPA approval of the Remedial Alternatives Screening Summary, Settling Defendants shall submit a Draft SFS Report. The Draft SFS Report shall document the development and analysis of remedial alternatives and provide a basis for any recommended fundamental remedy change for groundwater or soil gas remedy.

Summary of Task 12.0 Deliverables & Schedule

• Draft Remedial Alternative Screening Summary	60 days after EPA determination that a fundamental remedy change is warranted
• Final Remedial Alternatives Screening Summary	45 days after receipt of EPA comments
• Draft SFS	60 days after EPA approval of Remedial Alternatives Screening Summary
• Final SFS	60 days after receipt of EPA comments on the Draft SFS

Task 13.0 Supplemental Remedial Design

If, following evaluation of an SFS completed pursuant to Task 12.0 and any other relevant information, EPA determines that a fundamental change to the remedy selected in the ROD is necessary, EPA shall take such steps as are necessary under the NCP, including submission for public comment as necessary, to effect such change. This Task 13.0 sets forth the specifications, criteria, and other requirements for Supplemental Remedial Design ("RD") to implement any fundamental change effected by EPA to the remedy selected in the ROD. Settling

Defendants shall design and implement all remedy modifications to meet all applicable Site Performance Standards, including any additional Site Performance Standards developed and identified in connection with the fundamental remedy change.

Settling Defendants shall conduct the following pre-design and design activities for any fundamental change to the remedy selected in the ROD:

- Additional Field Investigations and Pilot Tests;
- Remedial Design Workplan;
- Draft Technical Memorandum (30% Design);
- Design Project Meeting;
- 60% Plans and Specifications;
- Final Technical Memorandum; and
- Remedial Design Report (100% Design).

Activities outlined in Tasks 12.0 -13.0 shall be conducted concurrent with the ongoing operation and maintenance of the existing groundwater and soil gas remedies as set forth in Tasks 1.0 and 7.0.

Task 13.1 Additional Field Investigations and Pilot Tests

In the event that additional field data are required to design any change to the existing remedies, Settling Defendants shall develop the appropriate workplans and conduct the required field investigations in accordance with Tasks 2.0, 5.0, 8.0, 9.0, and 10.0.

Task 13.2 Remedial Design Workplan

Settling Defendants shall submit an RD Workplan that details the manner in which the pre-design and design activities associated with the expansion of, or modifications to, the existing remedy will be implemented.

The RD Workplan shall include a comprehensive description of the plans and specifications to be prepared and a comprehensive design management schedule for the completion of each major activity and submission of each deliverable. Settling Defendants shall include the following in the RD Workplan:

- summary of existing data including physical and chemical characteristics of the contaminants identified and their distribution in the environmental media at the Site;
- summary of any treatability studies, including pilot test results, relating to the remedy expansion or modification;
- detailed description of the tasks to be performed, information required for each task, information to be produced during and at the conclusion of each task, and a description of the deliverables that will be submitted to EPA;
- project management plan, including a data management plan, which will address both data management and document control for all activities conducted during the Supplemental RD and Remedial Action ("RA"); and
- schedule for all tasks to be completes as part of the Supplemental RD and RA.

Task 13.3 Technical Memoranda

Settling Defendants shall submit a Draft Technical Memorandum (30% Design) and a Final Technical Memorandum (100% Design) for any remedy modification as selected in a ROD Amendment. Each Technical Memorandum shall contain, at a minimum, the following:

- field investigation and pilot test results;
- design criteria;
- results of any additional pre-design work;
- project delivery strategy;
- preliminary plans, drawing and sketches;
- required specifications in outline form; and

- preliminary construction schedule.

A schedule for submitting the Draft Technical Memorandum, and the design drawings and specifications, shall be specified in the RD Workplan. Settling Defendants shall submit a Final Technical Memorandum within thirty (30) days of receiving EPA's comments on the Draft Memorandum.

Task 13.4 Final Design Report

Settling Defendants shall submit a Final Design Report for any remedy modification as selected in a ROD Amendment. Each Final Design Report required by this task shall include, at a minimum, the following:

- complete (100%) design analysis;
- final plans and specifications;
- Construction Quality Assurance Project Plan ("CQAP");
- Performance Standards Verification Plan;
- Contingency Plan; and
- Remedial Action Workplan.

Summary of Task 13.0 Deliverables and Schedule

• Draft RD Workplan	60 days after EPA issues ROD Amendment
• Final RD Workplan	30 days after receipt of EPA comments
• Draft Technical Memorandum	As specified in the RD Workplan
• Final Technical Memorandum	30 days after receipt of EPA comments

Task 14.0 Remedial Action

The objective of Task 14.0 is to set forth the steps that shall be taken to implement, consistent with Tasks 12.0 and 13.0, any fundamental changes to the remedy effected by EPA,

and to operate and maintain the final remedy.

Task 14.1 Remedial Action Workplan

Settling Defendants shall submit an RA Workplan to implement any fundamental changes to the remedy effected by EPA. The RA Workplan shall contain the following:

- description of each construction activity and associated reporting requirements;
- schedule for completing construction activities;
- Project Management Plan that outlines the manner in which Settling Defendants will select and supervise an RA team;
- CQAP and methodology for its implementation;
- method for completing the operational test for the treatment systems to demonstrate that the Performance Standards are met for the affected media;
- Construction Contingency Plan and a methodology for implementation thereof;
- Construction HASP that includes procedures to decontaminate equipment and dispose of contaminated materials; and
- Performance Standards Verification Plan.

Task 14.2 Pre-construction Meeting

Within thirty (30) days after submission of an RA Workplan and prior to initiation of any significant construction, Settling Defendants shall have a Pre-construction Meeting with EPA, ADEQ, City of Goodyear representatives, and any other interested federal, state and local government agencies. The objective of the Pre-construction Meetings shall be to define the roles, relationships, and responsibilities of all parties, review work area security and safety protocols, review any access issues, review construction schedule, and review construction QA procedures. Results of the Pre-construction Meetings shall be documented and minutes transmitted to all parties in attendance, including a list of the names of people in attendance,

issues discussed, clarifications made, and instructions issued.

Task 14.3 Construction Quality Assurance Plan

Settling Defendants shall develop a CQAP for any RA Workplan. The CQAP shall be implemented for any significant construction to ensure, with a reasonable degree of certainty, that the completed RA meets or exceeds all design criteria, plans and specifications, and Performance Standards. The CQAP shall include the following elements:

- responsibilities and authorities of all organizations and key personnel involved in the design and construction of the RA;
- description of the quality control organization, including a chart showing lines of authority, members of the QA team, their responsibilities and qualifications, and acknowledgment that the QA team will implement the quality control system for all aspects of the work specified and shall report to the Project Coordinator and to EPA. Members of the QA team shall have a good professional and ethical reputation, previous experience in the type of QA/QC activities to be implemented, demonstrated capability to perform the required activities, and shall be independent of the construction contractor;
- description of the observations, inspections, and control testing that will be used to assure quality workmanship, verify compliance with the plans and specifications, or meet other QC objectives during implementation of the remedial action. This includes identification of sample size, sample locations, and sample collection or testing frequency, and acceptance and rejection criteria. The CQAP shall specify laboratories to be used, and include information which certifies that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards;
- reporting procedures, frequency, and format for QA/QC activities. This shall include such items as daily summary reports, inspection data sheets, problem identification, and corrective measures reports, design acceptance reports, and final documentation.

Provisions for the final storage of all records shall be presented in the CQAP. The QA official shall report simultaneously to Settling Defendants and to EPA; and

- list of definable features of the work to be performed. A definable feature of work is a task which is separate and distinct from other tasks and has separate quality control requirements.

Task 14.4 Construction HASP

Settling Defendants shall implement the Construction HASP ("CHASP") for any RA Workplan for any for any significant construction associated with the Supplemental RA. The CHASP shall comply with OSHA regulations and protocols and other applicable requirements. The CHASP shall describe health and safety risks, employee training, monitoring and personal protective equipment, medical monitoring, individuals responsible in an emergency, and provisions for site control for workers and for visitors to the job site.

Task 14.5 Remedial Action Construction

Settling Defendants shall construct the remedy as detailed in the RD Report and RA Workplan.

Task 14.6 Operation and Maintenance Plan

Settling Defendants shall amend the O&M Plan in place for the remedy to reflect any fundamental modifications of the Site remedy prior to implementing those modifications. Settling Defendants shall continue operation and maintenance of the remedy in accordance with the most updated applicable O&M Plan until such time as EPA determines that the cleanup requirements specified in the ROD have been met.

Any amendments to the O&M Plan shall include:

i) Equipment start-up and operator training:

a. technical specifications governing treatment systems;

b. requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up, and operation of the systems; and

c. schedule for training personnel regarding appropriate operational procedures once start up has been successfully completed.

ii) Description of normal operation and maintenance:

a. description of tasks required for system operation;

b. description of tasks required for system maintenance;

c. description of prescribed treatment or operating conditions; and

d. schedule showing the required frequency for each O&M task.

e. list of chemicals and waste streams maintained on-site, the waste classification for each, and the procedures for maintaining, shipping, and receiving these materials

iii) Description of potential operating problems:

a. description and analysis of potential operating problems;

b. sources of information regarding problems; and

c. common remedies or anticipated corrective actions.

iv) Description of routine monitoring and laboratory testing of treatment systems:

a. description of monitoring tasks;

b. description of required laboratory tests and their interpretation; and

c. schedule of monitoring frequency.

v) Description of alternate O&M:

a. alternate procedures to prevent undue hazard should system fail; and

b. analysis of vulnerability and additional resource requirements should a failure occur.

vi) Safety Plan:

a. description of precautions to be taken and required health and safety equipment, etc., for site personnel protection; and

b. safety tasks required in the event of systems failure.

vii) Description of Equipment:

a. equipment identification;

b. installation of monitoring components;

c. maintenance of site equipment; and

d. replacement schedule for equipment and installation components.

viii) Records and reporting:

a. operating logs;

b. laboratory records;

c. mechanism for reporting spills and emergencies;

d. a list of spill and emergency contacts; and

e. maintenance records.

ix) Operation Flow Chart:

a. criteria to shut down individual wells;

b. criteria to shut down and decommission the entire system; and

c. procedures for startup following a shutdown.

Task 14.7 Pre-final Construction Inspections

When Settling Defendants believe that future RA construction is complete, in compliance with all ARARs, and the RA, or any discrete portion thereof as described in an RA Workplan is

Operational and Functional ("O&F"), Settling Defendants shall notify EPA and ADEQ for the purposes of conducting a Pre-final Construction Inspection to be attended by EPA and ADEQ. The objective of the Pre-final Construction Inspection(s) shall be to determine whether construction is complete, whether the facility is operating in compliance with ARARs, and whether the inspected portion of the remedial action is O&F. Any outstanding construction items discovered during the inspection shall be identified and described in a letter report to EPA. Settling Defendants shall certify that the equipment meets the purpose and intent of the specifications. If a Pre-final Construction Inspection is held for a portion of the RA, additional inspections will be required to ensure that each portion of the RA has been properly inspected.

Settling Defendants shall submit a Pre-final Construction Inspection Report that outlines any outstanding construction items, actions required to resolve the outstanding items, a schedule for completion of the outstanding items, and an anticipated date for a Final Inspection. The Pre-final Inspection Report shall be submitted in the form of a bullet list or a narrative. Retesting shall be completed where deficiencies are revealed. The Pre-final Inspection Report shall include a schedule for completion of any additional work deemed necessary by EPA.

Task 14.8 Final Construction Inspection

Within fourteen (14) days following completion of any work identified in the Pre-final Inspection Report, Settling Defendants shall notify the EPA and ADEQ for the purposes of conducting a Final Construction Inspection. The Final Construction Inspection shall consist of a walk-through inspection by EPA and ADEQ. The Pre-final Inspection Report shall be used as a checklist for the Final Construction Inspection focusing on the outstanding construction items identified in the Pre-final Inspection Report.

Any outstanding construction items discovered during the Final Construction Inspection that require additional correction shall be identified and described by Settling Defendants in a

letter report to EPA. Should any items be left unresolved at the Final Construction Inspection, that inspection shall be reclassified as a Pre-final Construction Inspection requiring resolution before any Final Construction Inspection. If at the time of a Pre-final Construction Inspection no items are identified that require correction, the requirement for a Final Construction Inspection may be waived by EPA.

Task 14.9 Final Remedial Action Construction Complete Report

After construction is completed on the entire RA and all systems are determined by EPA to be O&F as intended, Settling Defendants shall submit an RA Construction Completion Report. The RA Construction Completion Report shall include a statement by both a registered Professional Engineer and a representative of Settling Defendants that the RA construction has been completed. The RA Construction Completion Report shall summarize the work as defined in this SOW, describe deviations from the RD documents, include as-built drawings signed and stamped by a Professional Engineer, provide actual costs of the RA and O&M to date, and provide a summary of the results of operational and performance monitoring completed to date. The RA Construction Completion Report shall contain the following statement, signed by a responsible official of Settling Defendants:

> "To the best of our knowledge, after thorough investigation, we certify that the information contained in or accompanying this submission is true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Task 14.10 Work Completion Report

In accordance with the CD, upon concluding that all phases of the Work, including O&M, for a remedy for any individual media area have been fully performed, Settling Defendants shall submit to EPA for review and approval a report documenting completion of the Work ("Work Completion Report"). The Work Completion Report shall include, or incorporate by reference,

the RA Construction Complete Report for that individual remedy, together with information to support the conclusion that all phases of the work, including O&M, have been fully performed.

Summary of Task 14.0 Deliverables and Schedule

•	Draft RA Workplan	120 days after EPA approval of media-specific RD
•	Final RA Workplan	60 days after receipt of EPA comments
•	Pre-Construction Meeting	30 days after EPA approval of Final RA Workplan
•	Draft RA Workplan	60 days after EPA approval of the Final RD
•	Final RA Workplan	30 days after receipt of EPA comments
•	Draft RA O&M Plan	60 days after EPA approval of the RA Workplan
•	Final RA O&M Plan	30 days after receipt of EPA comments

Task 15.0 Data Management

Settling Defendants shall consistently document the quality and validity of field and laboratory data compiled during all investigations required by this SOW according to the procedures described under this task.

Task 15.1 Document Field Activities

Settling Defendants shall ensure that all information gathered as part of the investigations described in the SOW shall be consistently documented and adequately recorded in well-maintained field logs and laboratory reports. The method(s) of documentation shall be specified in the workplans for each of the investigations described in this SOW. Field logs shall be used to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports shall document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and data deficiencies. EPA may request copies of each of these documents at any time during performance of the Work described in this SOW. Ultimately, copies of each of these documents

shall be compiled and submitted to EPA as appendices to reports required by this SOW.

Task 15.2 Sample Management and Tracking

Settling Defendants shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and used in the development and evaluation of remedial alternatives. Analytical results developed under the this SOW will not be included in any investigation reports unless accompanied by or cross-referenced to the corresponding QA/QC report.

In addition, Settling Defendants shall establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

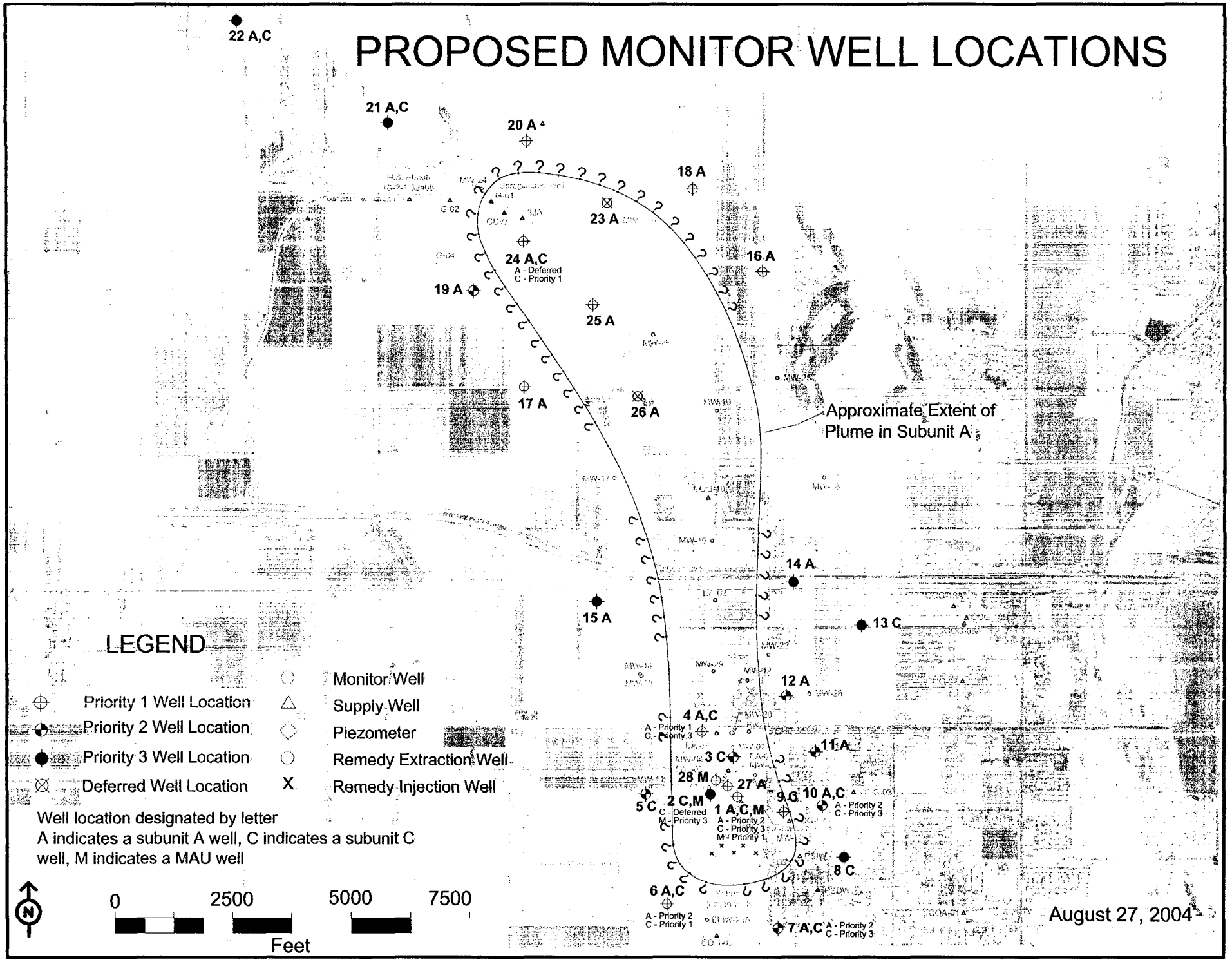
Task 15.3 Database Management

Settling Defendants shall maintain any groundwater data collected as part of this SOW in an electronic database that will comply with the most recent ADEQ Groundwater Data Submittal Guidance Document, currently Version 3.1 (December 2003), and any additional requirements deemed necessary by EPA. Settling Defendants shall prepare a Draft Data Management Plan ("DMP") describing in detail the data management procedures for all Site-related data. The DMP shall describe procedures for managing all groundwater, soil, soil gas, air, and any other Site-specific data collected as part of this SOW, and describe how this new data will be integrated and comprehensively managed with historical data collected previously. The DMP shall include procedures and time lines for sharing data with EPA and other stakeholders, including procedures for providing both electronic and hard copies, including a list of recipients of each type of data.

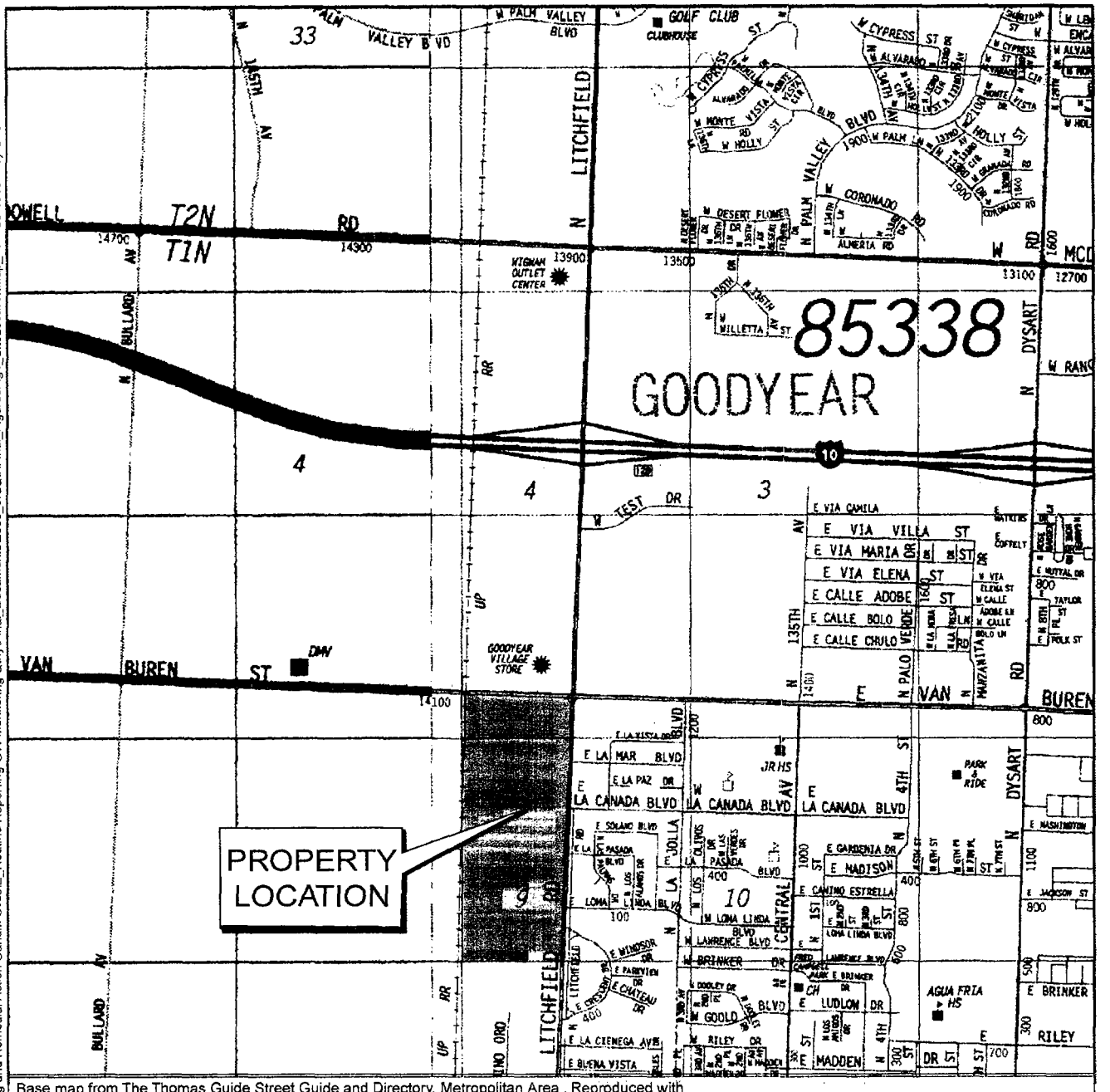
Summary of Task 15.0 Deliverables and Schedule

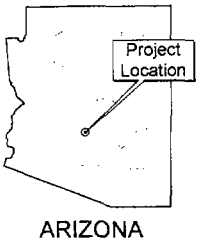
- Draft Data Management Plan — February 15, 2005
- Final Data Management Plan — 30 days after receipt of EPA comments

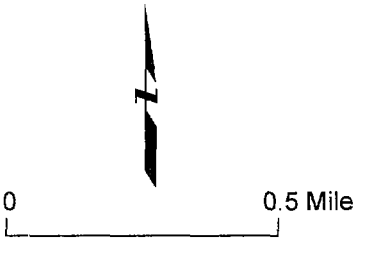
PROPOSED MONITOR WELL LOCATIONS



APPENDIX D







UNIDYNAMICS PHOENIX, INC. PROPERTY LOCATION MAP
Phoenix-Goodyear Airport
North Superfund Site
Goodyear, Arizona

Figure 1

APPENDIX E

EASEMENT AND
DECLARATION OF RESTRICTIVE COVENANTS

This Environmental Protection Easement and Declaration of Restrictive Covenants is made this ____ day of _____, 20___, by and between _____, ("Grantor"), having an address of _____, and, _____ _____("Grantee"), having an address of _____ _____.

WITNESSETH:

WHEREAS, Grantor is the owner of a parcel of land located in the county of Maricopa, State of Arizona, more particularly described on **Exhibit A** attached hereto and made a part hereof (the "Property"); and

WHEREAS, the Property is part of the Phoenix-Goodyear Airport Area Superfund Site ("Site"), which the U.S. Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on September 8, 1983; and

WHEREAS, in a Record of Decision dated September 26, 1989 (the "ROD"), the EPA Region IX Regional Administrator selected a "remedial action" for the Site, which provides, in part, for the following actions: (a) extraction and treatment of contaminated groundwater using air strippers and carbon air emissions treatment, followed by aqueous phase carbon treatment of the groundwater prior to reinjection into the aquifer; and (b) soil vapor extraction followed by treatment or in the alternative, soils excavation; and

WHEREAS, implementation of the remedial action, including groundwater extraction and treatment and soil vapor extraction and treatment, and additional investigation continues at the Site; and

WHEREAS, the United States and Unidynamics/Phoenix, Inc. ("Unidynamics") and Crane Co. ("Crane") have entered into a Partial Consent Decree in Crane Co. et al. v. United States et al., CIV 03-2226-PHX-ROS, CIV 04-1400-PHX-ROS (Consolidated) (the "Consent

Decree") with respect to the Site pursuant to which Unidynamics and Crane agree to perform investigation and remedial action at the Site, and (a) to ensure a right of access over the Property to EPA for purposes of implementing, facilitating and monitoring the remedial action; and (b) to impose on the Property use restrictions as covenants that will run with the land for the purpose of protecting human health and the environment; and

WHEREAS, the parties hereto have agreed, consistent with the Consent Decree, (a) to grant a permanent right of access over the Property to the Grantee for purposes of implementing, facilitating and monitoring the remedial action; and (b) to impose on the Property use restrictions as covenants that will run with the land for the purpose of protecting human health and the environment; and

WHEREAS, Grantor wishes to cooperate fully with the Grantee in the implementation of all response actions at the Site;

NOW, THEREFORE:

1. Grant: Grantor, on behalf of itself, its successors and assigns, in consideration of **[DEPENDS ON GRANTEE]**, does hereby covenant and declare that the Property shall be subject to the restrictions on use set forth below, and does give, grant and convey to the Grantee, and its assigns, with general warranties of title, (a) the perpetual right to enforce said use restrictions, and (b) an environmental protection easement of the nature and character, and for the purposes, hereinafter set forth with respect to the Property.

2. Purpose: It is the purpose of this instrument to convey to the Grantee real property rights, which will run with the land, to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to contaminants.

3. Restrictions on use: The following covenants, conditions, and restrictions apply to the use of the Property, run with the land, are binding on the Grantor and all successive owners of any interest in the property and any other persons or entities entitled by ownership, leasehold, or other legal relationship to the right to occupy any portion of the Property, and are for the benefit of EPA **[AND ADEQ]** as a third party beneficiary[ies]:

[IF FOR PARCELS B AND/OR C, INSERT RESTRICTIONS FROM CD]

4. Modification of restrictions: The above restrictions may be modified or rescinded, in whole or in part, only as allowed pursuant to the Consent Decree.

5. Easement: Grantor hereby grants to the Grantee a continuing right of access at all reasonable times to the Property and with consideration for minimizing disruption of ongoing activities being carried out on the Property, for purposes of:

a) Monitoring response actions on the Site.

b) Verifying any data or information submitted to the United States.

c) Conducting investigations relating to contamination at or near the Site.

d) Obtaining samples including, without limitation, obtaining samples of air, water, sediments, soils, and specifically, without limitation, obtaining split or duplicate samples.

e) Assessing the need for, planning, or implementing additional response actions at or near the Site.

f) Implementing the response action in the ROD including amendments or modifications thereto.

g) Verifying that no action is being taken on the Property in violation of the terms of this instrument.

h) Conducting periodic reviews of the remedial action, including but not limited to, reviews required by applicable statutes and/or regulations.

6. Reserved rights of Grantor: Grantor hereby reserves unto itself, its successors, and assigns, all rights and privileges in and to the use of the Property which are not incompatible with the restrictions, rights and easements granted herein.

7. Nothing in this document shall limit or otherwise affect EPA's rights of entry and access, or EPA's authority to take response actions, under CERCLA, the National Contingency Plan, or other federal law.

8. No Public Access and Use: No right of access or use by the general public to any portion of the Property is conveyed by this instrument.

9. Term of the Easement: This easement and the restrictive covenants herein granted shall remain in effect until rescinded, abandoned, or modified pursuant to Paragraph 30 of the Consent Decree.

10. Notice requirement: Grantor agrees to include in any instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN EASEMENT AND DECLARATION OF

RESTRICTIVE COVENANTS, DATED _____, 20__, RECORDED IN THE PUBLIC LAND RECORDS ON _____, 20___, IN BOOK _____, PAGE ____, IN FAVOR OF, AND ENFORCEABLE BY, THE GRANTEE AND FOR THE BENEFIT OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY [AND THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY].

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor must provide Grantee with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference.

11. Enforcement: The Grantee shall be entitled to enforce the terms of this instrument by resort to specific performance or legal process. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Enforcement of the terms of this instrument shall be at the discretion of the Grantee, and any forbearance, delay or omission to exercise its rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Grantee under this instrument.

12. Damages: Grantee shall be entitled to recover damages for violations of the terms of this instrument, or for any injury to the remedial action.

13. Waiver of certain defenses: Grantor hereby waives any defense of laches, estoppel, or prescription.

14. Covenants: Grantor hereby covenants to and with the Grantee and its assigns, that the Grantor is lawfully seized in fee simple of the Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein, that the Property is free and clear of encumbrances, except those noted on **Exhibit B** attached hereto, and that the Grantor will forever warrant and defend the title thereto and the quiet possession thereof.

15. Notices: Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:	To Grantee:
_____	_____
_____	_____
_____	_____

To EPA: To ADEQ:

16. General provisions:

a) Controlling law: The interpretation and performance of this instrument shall be governed by the laws of the State of Arizona and any applicable federal laws.

b) Liberal construction: Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the grant to effect the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

c) Severability: If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.

d) Entire Agreement: This instrument sets forth the entire agreement of the parties with respect to rights and restrictions created hereby, and supersedes all prior discussions, negotiations, understandings, or agreements relating thereto, all of which are merged herein.

e) No Forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

f) Joint Obligation: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

g) Successors: The covenants, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantee" and their personal representatives, heirs, successors, and assigns. The

rights of the Grantor under this instrument are freely assignable, subject to the notice provisions hereof.

h) Termination of Rights and Obligations: A party's rights and obligations under this instrument terminate upon transfer of the party's interest in the Easement or Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

i) Third Party Beneficiary. EPA's [AND ADEQ'S] rights as third party beneficiary of this Covenant shall be construed pursuant to principles of contract law under the statutory and common law of the State of Arizona.

j) Captions: The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

k) Counterparts: The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

TO HAVE AND TO HOLD unto the Grantee and its assigns forever.

IN WITNESS WHEREOF, Grantor has caused this Agreement to be signed in its name.

Executed this _____ day of _____, 20__.

_____

By: _____

Its: _____

STATE OF _____)
) ss
COUNTY OF _____)

On this __ day of _____, 20__, before me, the undersigned, a Notary Public in and for the State of _____, duly commissioned and sworn, personally appeared _____, known to be the _____ of _____, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be

the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute said instrument.

Witness my hand and official seal hereto affixed the day and year written above.

_____
Notary Public in and for the
State of _____

My Commission Expires: _____.

This easement is accepted this ____ day of _____, 20__.

the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns.

_____

By: _____

_____

Attachments:	Exhibit A	-	legal description of the Property
	Exhibit B	-	list of permitted title encumbrances

APPENDIX F

APPENDIX F

BROWNFIELDS INVENTORY, ASSESSMENT, AND REMEDIATION SUPPLEMENTAL ENVIRONMENTAL PROJECT

Unidynamics-Phoenix, Inc. and Crane Co. (collectively, "Settling Defendants") shall satisfactorily complete implementation of the Brownfields Inventory, Assessment, and Remediation supplemental environmental project ("Brownfields SEP") within the City of Goodyear, Arizona ("City"), described in this Appendix F in accordance with the requirements set forth in Section XVII of the Consent Decree and this Appendix F and consistent with EPA's *Final Supplemental Environmental Projects Policy* (April 1998) and EPA's Guidance *Using SEPs to Facilitate Brownfields Redevelopment* (September 1998). The parties recognize that Settling Defendants intend to contract with the City, consistent with the applicable paragraphs of the Consent Decree and subject to EPA approval, for the performance of services related to implementation of the Brownfields SEP.

Purpose:

The City of Goodyear is a rapidly growing municipality with a current population of over 35,000 residents. The City has experienced a 105% population increase since 1995 alone. The City is interested in promoting sustainable development within its borders, including careful infill development (development within the existing, built Goodyear community) that provides opportunities for residential, recreational, and industrial land to coexist. Infill development also helps to prevent potential sprawl that is prevalent within the metropolitan Phoenix area. Creating a vibrant and healthy community is dependent on the inventory and assessment of brownfields properties, defined as sites that are abandoned, idled, or under-used where expansion or redevelopment is complicated by real or perceived contamination. The City has assembled a Brownfields Inventory, Assessment, and Remediation Plan ("Brownfields Plan") to provide a framework for the inventory, assessment, and remediation of certain of these sites.

The Brownfields SEP is intended to substantially advance brownfields redevelopment in the City though funding and implementation of inventory, assessment and remediation activities at various properties within the City. Specifically, the Brownfields SEP establishes a goal of completion of an inventory and Phase 1 Assessments of up to 25 possible brownfields sites in the City, completion of Phase 2 Assessments for four of those sites, and remediation of three of those sites.

Environmental and Community Benefits:

Redevelopment of brownfields sites will help the City to maximize infill development with the accompanying benefits of rejuvenating neighborhoods, reducing blight, and mitigating threats to human health and the environment. Abandoned sites can be transformed into productive commercial and industrial properties, vibrant recreation

areas, residential use or other needed amenities. The Brownfields SEP is expected to provide the City with three remediated sites that can be used for residential or other development. In addition, the brownfields inventory will also generate greater interest in investing in the community and better chances for success of the City's overall brownfields program. The City expects that most of the sites identified through this project will be in the Historic Goodyear area. This will potentially increase the City's ability to attract the development of infill housing, which will work toward the City's long-range goal to address brownfields properties while avoiding the creation of new brownfields.

Project Criteria:

Settling Defendants shall ensure, through their SEP Agreement with the City or otherwise, that the following criteria are met during implementation of the Brownfields SEP:

Stage 1: Site Inventory and Phase 1 Assessments

Stage 1 of the Brownfields SEP will include an inventory and initial assessment of up to 25 of the City's brownfields sites. Stage 1 activities will be contracted to and managed by a professional environmental engineering firm with experience in brownfields programs.

The Stage 1 inventory shall be based on a comprehensive review of potential brownfields sites in the City and thorough research of Arizona agencies and property ownership records with the assistance of the City's Planning Department. During the Stage 1 inventory process, existing city documents and plans, including the General Plan, the Employment Corridor Study, the Zoning Ordinance and the Redevelopment Plan, will be consulted.

Each Phase 1 Assessment will follow current ASTM Phase 1 E1527 standards or EPA's All Appropriate Inquiries Rule until November 1, 2006, after which time the Phase 1 Assessments will meet EPA's All Appropriate Inquiries Rule.

All phases of the Brownfields SEP will incorporate public participation to allow those most affected by the SEP to comment and provide input on the selected sites. Thus, Stage 1 will include the development of brochures, handouts and on-line information, public meetings, and media outreach. The City will also utilize its Brownfields Advisory Committee[1] to provide input regarding next steps within the Brownfields SEP. Information from Stage 1, including public input, will assist the City to prioritize plans and goals to focus on brownfield sites to be further investigated in Stage 2.

[1] In anticipation of conducting brownfields projects, in November 2003 the City established a Brownfields Advisory Committee comprised of local residents, land developers, land owners, and business leaders. The Brownfields Advisory Committee will be used as a resource for this project.

The estimated contractual cost for identification and listing of approximately 25 properties for Stage 1 Site Inventory and Phase 1 Assessment is $100,000. The City will take financial responsibility for educating its staff and conducting outreach for public input into the brownfields process, and such costs will not be considered Eligible SEP Costs for purposes of the Consent Decree.

Stage 2: Phase 2 Assessments

Stage 2 of the Brownfields SEP contemplates selection of at least four potentially contaminated sites from the inventory produced in Stage 1 to undergo Phase 2 assessments. Sites will be selected for Phase 2 Assessment utilizing the following criteria: location, redevelopment potential, estimated cost to clean up the site, and the potential value to the community. The selection process shall include input from the Stage 1 contractor, the City, the Brownfields Advisory Committee, and residents representing downtown and employment corridor stakeholders, along with environmental and health professionals. Sites selected for Phase 2 Assessment shall not have any known viable responsible party who would be responsible for addressing the contamination under state or federal law.

Should any privately-owned property be selected to undergo Phase 2 Assessment, the property owners will be educated about the assessment process through one-on-one meetings and will be required to sign access authorizations permitting the City and its consultants to conduct testing on the property as a component of the Phase 2 Assessment. In an effort to keep the public informed and involved in the process, sampling and testing results will be made publicly available within a reasonable time of obtaining and compiling the final results.

Each Phase 2 Assessment shall follow ASTM guidelines.

The estimated cost of each Phase 2 Assessment is $50,000. Assuming that four sites are selected for Phase 2 Assessments, the estimated cost of Stage 2 activities is $200,000.

Stage 3: Site Remediation

Stage 3 of the Brownfields SEP contemplates selection for complete remediation of at least three contaminated properties that have undergone Phase 2 Assessments in Stage 2. Sites will be selected for remediation utilizing the following criteria: location, redevelopment potential, estimated cost to clean up the site, and the potential value to the community; and criteria already established by the Environmental Resources Department, state regulations, recommendations, the City Center Master Plan, the Employment Corridor Study, Zoning Ordinances, and the Redevelopment Plan. The selection process shall include input from the City and its consultant, the Brownfields Advisory Committee, and residents representing downtown and employment corridor stakeholders,

along with environmental and health professionals. Sites selected for remediation shall not have any known viable responsible party who would be responsible for addressing the contamination under state or federal law.

Remediation of the selected sites shall be performed in accordance with all applicable local, state, and federal laws and regulations. Remediation of a site will be considered complete when the site is confirmed through sampling to meet residential standards and a No Further Action determination is issued from the Arizona Department of Environmental Quality ("ADEQ").

No less than $650,000 shall be expended on Stage 3 – remediation of brownfields sites -- of the Brownfields SEP. Any additional funds remaining after completion of remediation of three sites shall be used for remediation of additional sites selected using the criteria identified above.

In the event that one or more of the three sites identified for remediation cannot be fully remediated for $650,000, partial remediation of a site may be performed. However, Settling Defendants shall ensure, including through expenditure of additional funds as necessary, that no site is partially remediated in such a way that the threat to human health and the environment is greater than when the remediation was initiated.

Total SEP Cost:

In performing the Brownfields SEP, Settling Defendants shall expend $1,000,000 in Eligible SEP Costs consistent with the allocation set forth above under Project Criteria. Settling Defendants shall not be required to expend more than $1,000,000, except in the event (described above in Project Criteria: Stage 3) that additional expenditures are necessary to ensure that any partial remediation of a brownfields site does not create a threat to human health and the environment that is greater than when the remediation was initiated.

For purposes of the Brownfield SEP, internal costs incurred by the City on project administration (including internal contract procurement costs) and public outreach shall not be considered Eligible SEP Costs under the Consent Decree.

Project Schedule:

Settling Defendants shall ensure completion of this SEP by no later than three years after the Effective Date of the Consent Decree.

APPENDIX G

Appendix G

Requirements for Compliance with Financial Security Option Under Paragraph 47.f. of Consent Decree

I. Settling Defendant(s) may satisfy the requirements of Paragraph 47.f. of this Consent Decree by demonstrating to EPA that such Settling Defendant(s) pass a financial test as specified in this Appendix G. To pass this test, the Settling Defendant(s) must meet the following criteria with respect to the financial security amount (the "Financial Security Amount") specified in the first sentence of Paragraph 47 of this Consent Decree (initially $35 million, as such amount may be revised in accordance with the provisions of Section XIII (Assurance of Ability to Complete Work)):

A. The Settling Defendant(s) must have:

1. A current rating for its most recent bond issuance of AAA, AA, A, or BBB as issued by Standard & Poor's or Aaa, Aa, A, or Baa as issued by Moody's; and
2. Net working capital (as defined in U.S. federal regulations at 40 C.F.R. §264.141(f)) equal to at least 6 times the Financial Security Amount; and
3. Tangible net worth (as defined in U.S. federal regulations at 40 C.F.R. §264.141(f)) equal to at least $15,000,000; and
4. Assets (as defined in U.S. federal regulations at 40 C.F.R. §264.141(f)) located in the United States amounting to at least (a) 90 percent of its total assets or (b) 6 times the Financial Security Amount; and
5. Annual Operating Cash Flow equal to or greater than an amount calculated as 2.5 times the Financial Security Amount, where "Annual Operating Cash Flow" means the line item entitled "Total Provided from Operating Activities" as set forth in the Settling Defendant(s)' audited annual Consolidated Statements of Cash Flow; and
6. Annual Operating Cash Flow (as defined in item (5) above) equal to or greater than an amount calculated as 5 times the Next Year Projected Cost of Work, where "Next Year Projected Cost of Work" means, as calculated during any fiscal year of Settling Defendant(s), the total dollar amount of expenditures projected to be necessary in the immediately following fiscal year to fully fund the Work for such year.

II. To demonstrate compliance with the test set forth in item (I) above, Settling Defendant(s) must submit the following items to EPA in accordance with Section XXVII (Notices and Submissions) of the Consent Decree:

A. A letter signed by the Settling Defendant(s)' chief financial officer and worded substantially in the form of Exhibit A to this Appendix; and

B. A copy of the independent certified public accountant's unqualified opinion of the Settling Defendant(s)' financial statements for the latest completed fiscal year,

including a copy of Settling Defendant(s)' audited financial statements for such fiscal year (which opinion shall, without limitation, (1) find that the Settling Defendant(s)' consolidated financial statements present fairly, in all material respects, the financial position of the Settling Defendant(s) and its/their subsidiaries as of the end of the fiscal year and (2) provide an unqualified opinion regarding the effectiveness of Settling Defendant(s)' internal control over financial reporting); and

C. A special report on applying agreed-upon procedures from the Settling Defendant(s)' independent certified public accountants verifying the letter described in item (A) above and worded substantially in the form of Exhibit B to this Appendix.

III. A Settling Defendant seeking to demonstrate compliance with Paragraph 47.f. of the Consent Decree and this Appendix G must submit the items specified in Sections II(a), (b), and (c) above to EPA (in accordance with Section XXVII (Notices and Submissions) of the Consent Decree):

A. Initially, within 10 days after entry of the Consent Decree by the Court; and

B. Thereafter, annually within 90 days after the close of each succeeding fiscal year of the Settling Defendant(s).

Exhibit A to Appendix G

Form of Letter from Settling Defendant(s)' Chief Financial Officer

Dear [_____]:

I am the chief financial officer of [name and address of firm] (the "Company"). This letter is in support of the Company's use of the financial test to demonstrate financial assurance for its obligations under that certain Consent Decree (the "Consent Decree"), dated _____ ___, _____, Docket No. [_____], between the Company and the United States Environmental Protection Agency ("EPA"), entered pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. § 9607 et seq. ("CERCLA").

[Fill out the following five paragraphs regarding CERCLA settlements, RCRA facilities, and associated financial assurance requirements. If the Company has no CERCLA settlement or RCRA facility obligations that belong in a particular paragraph, write "None" in the space indicated. For each settlement and facility, include its settlement Docket No. or EPA Identification Number, as the case may be, and the financial assurance dollar amount associated with such settlement and/or facility.]

1. The dollar amount of financial assurance covered by the Company's use of the financial test, in accordance with Paragraph [_____] of the Consent Decree, is [$_____].

2. The Company is a signatory to the following CERCLA settlements (other than the Consent Decree) under which the Company has demonstrated financial assurance through the use of a financial test. The dollar amount of such financial assurance covered by a financial test is shown for each such settlement: ____.

3. The Company is the owner or operator of the following facilities regulated under the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. § 6901 et seq. ("RCRA"), for which the Company has demonstrated financial assurance for closure or post-closure care or corrective action through the financial test specified in subpart H of 40 CFR parts 264 and 265. The dollar amount of such financial assurance covered by the financial test is shown for each facility: ____.

4. The Company guarantees the CERCLA settlement obligations and/or the RCRA facility (closure, post-closure, and/or corrective action) obligations of the following guaranteed parties. The current dollar amount of the CERCLA settlement and RCRA facility obligations so guaranteed is shown for each such settlement and/or facility: ____.

5. The Company [insert "is required" or "is not required"] to file a Form 10K with the Securities and Exchange Commission ("SEC") for the Company's latest fiscal year.

6. The Company currently has a [senior credit] [bond] rating of [___] as issued by Standard & Poor's and/or [___] as issued by Moody's Investors Service.

7. The Company's fiscal year ends on [month, day]. I hereby certify that the figures for the following items marked with an asterisk are derived from the Company's independently audited, year-end financial statements for its latest completed fiscal year, ended [date], and further certify as follows:

*A. The aggregate total of the dollar amounts shown in Paragraphs 1 through 4 above equals [$____].

*B. Company's current assets equal [$___]

*C. Company's current liabilities equal [$___]

D. Company's net working capital (line B minus line C) equals [$___]

*E. Company's tangible net worth equals: [$____]

*F. Company's total assets in the U.S. equal [$_____].

*G. Company's annual operating cash flow equals [$____].

H. The "Next Year Projected Cost of Work," calculated pursuant to Section I(A)(5) of Appendix [___] to the Consent Decree, is [$____].

I. Is line D at least equal to an amount calculated as 6 times line A?
(Yes/No): [____]

J. Is line E at least equal to $15,000,000? (Yes/No): [____]

K. Is line F either (i) equal to or greater than 6 times line A or (ii) equal to or greater than an amount calculated as 90% of the Company's total assets? (Yes/No): [____]

L. Is line G equal to or greater than an amount calculated as 2.5 times line A? (Yes/No): [____]

M. Is line G equal to or greater than an amount calculated as 5 times line H? (Yes/No): [____]

I hereby certify that, to the best of my knowledge after thorough investigation, the information contained in this letter is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ [Signature]

_____ [Name]

_____ [Title]

_____ [Date]

[NOTARY BLOCK]

Exhibit B to Appendix G

Form of Special Report on Applying Agreed-Upon Procedures from Settling Defendant(s)' Independent Certified Public Accountant

To the Board of Directors and Management of [_____]:

We have performed the procedures outlined below, which were agreed to by [Company] (the "Company"), to assist the Company in confirming selected financial data contained in the attached letter from [_____], the Company's Chief Financial Officer, dated [_____], to the Regional Administrator, United States Environmental Protection Agency, Region [__] (the "CFO Letter"). We have been advised by the Company that the CFO Letter has been or will be submitted to the United States Environmental Protection Agency ("EPA") in support of the Company's use of a financial test to demonstrate financial assurance for the Company's obligations under that certain Consent Decree (the "Consent Decree"), dated _____ ___, _____, Docket No. [_____], between the Company and EPA. The procedures outlined below were performed solely to assist the Company in complying with the financial assurance requirements contained in the Consent Decree.

This agreed-upon procedures engagement was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants. The sufficiency of these procedures is solely the responsibility of those parties specified in this report. Consequently, we make no representation regarding the sufficiency of the procedures described below either for the purpose for which this report has been requested or for any other purpose.

The procedures we performed and our associated findings are as follows:

1. We confirm that we have audited the consolidated financial statements of the Company as of and for the fiscal year ended [December 31, 2004] in accordance with generally accepted accounting principles in the United States (such audited, consolidated financial statements, the "Audited Financials"). [Our report dated [_____], with respect thereto, is included in the Company's [2004] Annual Report on Form 10-K.]

2. We compared the amount of the Company's total current assets as of [December 31, 2004], as defined and set forth in the Audited Financials and as calculated therein as [$_____], with the amount set forth in Line 7(B) of the CFO Letter ("Current Assets"), and found such amounts to be in agreement.

3. We compared the amount of the Company's total current liabilities as of [December 31, 2004], as defined and set forth in the Audited Financials and as calculated therein as [$_____], with the amount set forth in Line 7(C) of the CFO Letter ("Current Liabilities"), and found such amounts to be in agreement.

4. Using data set forth in the Audited Financials, we calculated the amount of the Company's net working capital as of [December 31, 2004] as [$_____], by [subtracting total current liabilities of [$_____] from total current assets of [$_____]]. We compared the amount of the Company's net working capital as so calculated with the amount set forth in Line 7(D) of the CFO Letter ("Net Working Capital"), and found such amounts to be in agreement.

5. Using data set forth in the Audited Financials, we calculated the amount of the Company's tangible net worth as of [December 31, 2004] as [$_____], by [subtracting the amount of net intangible assets of [$_____] from the amount of total stockholders' equity of [$_____]]. We compared the amount of the Company's tangible net worth as so calculated

with the amount set forth in Line 7(E) of the CFO Letter ("Tangible Net Worth"), and found such amounts to be in agreement.

6. We compared the amount of the Company's total assets located in the United States as of [December 31, 2004] of [$_____] (as such amount was derived by the Company from its underlying accounting records that support the Audited Financials and notified to us in writing) with the amount set forth in Line 7(F) of the CFO Letter, and found such amounts to be in agreement. **OR** We calculated the percentage of Company assets located in the United States as of [December 31, 2004] by dividing the amount of the Company's total assets located in the United States as of [December 31, 2004] of [$_____] (as such amount was derived by the Company from its underlying accounting records that support the Audited Financials and notified to us in writing) by the amount of the Company's total assets as of [December 31, 2004] as defined and set forth in the Audited Financials, and found such percentage to be greater than 90%.

7. We compared the amount of the Company's operating cash flow as of [December 31, 2004], as defined and set forth in the Audited Financials [under the line item "total provided from operating activities"] and as calculated therein as [$_____], with the amount set forth in Line 7(G) of the CFO Letter ("Operating Cash Flow"), and found such amounts to be in agreement.

8. The dollar amount identified in Line 7(A) of the CFO Letter, [$_____], is hereinafter referred to as the "Financial Assurance Amount." Our calculation of the amount of the Company's Net Working Capital (as set forth in Line 4 above) is [greater to or equal than] [less than] an amount calculated as 6 times the Financial Assurance Amount.

9. Our calculation of the amount of the Company's Tangible Net Worth (as set forth in Line 5 above) is [greater to or equal than] [less than] $15 million.

10. Our calculation of the Company's Operating Cash Flow (as set forth in Line 7 above) is [greater to or equal than] [less than] an amount calculated as 2.5 times the Financial Assurance Amount.

11. Our calculation of the Company's Operating Cash Flow (as set forth in Line 7 above) is [greater to or equal than] [less than] an amount calculated as 5 times the "Next Year Projected Cost of Work," as such term is defined in Line 7(H) of the CFO Letter.

The foregoing agreed-upon procedures do not constitute an audit of the Company's financial statements or any part thereof, the objective of which is the expression of opinion on the financial statements or a part thereof. Accordingly, we do not express such an opinion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.

This report is intended solely for the information and use of the Board of Directors and Management of the Company and is not intended to be and should not be used by anyone other than these specified parties; provided, however, that we acknowledge and agree that the Company may provide this report to the United States Environmental Protection Agency in support of the Company's financial assurance demonstration under the Consent Decree.

_____ [Signature]

_____ [Name]

_____ [Date]

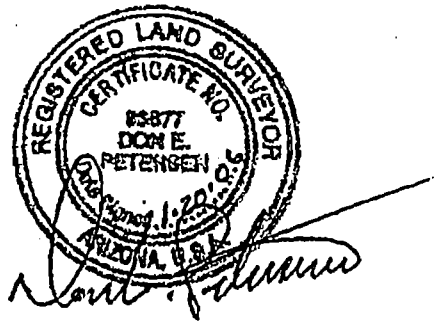
APPENDIX H

PROPOSED LEGAL DESCRIPTION
FOR
AREA "B"

BEING A PORTION OF THE NORTHEAST QUARTER OF SECTION 9, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 9; THENCE NORTH 89° 31' 08" WEST ALONG THE NORTH LINE OF SAID NORTHEAST QUARTER OF SAID SECTION 9, SAID NORTH LINE BEING THE BASIS OF BEARING, FOR A DISTANCE OF 1221.24 FEET; THENCE SOUTH 00° 19' 28" WEST 40.00 FEET TO THE TRUE POINT OF BEGINNING;

THENCE CONTINUING SOUTH 00° 19' 28" WEST 811.00 FEET;
THENCE SOUTH 89° 31' 08" EAST 541.17 FEET;
THENCE NORTH 00° 19' 47" EAST 811.00 FEET TO A POINT 40.00 FEET SOUTH OF SAID NORTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9;
THENCE NORTH 89° 31' 08" WEST PARALLEL WITH AND 40.00 FEET SOUTH OF SAID NORTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9 FOR A DISTANCE OF 541.24 FEET TO THE POINT OF BEGINNING.

SAID DESCRIBED PARCEL CONTAINS 438,814 SQUARE FEET OR 10.0761 ACRES MORE OR LESS.



PROPOSED LEGAL DESCRIPTION
FOR
AREA "C"

BEING A PORTION OF THE NORTHEAST QUARTER OF SECTION 9, TOWNSHIP 1 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE SAID NORTHEAST CORNER OF SAID SECTION 9; THENCE SOUTH 00° 19' 47" WEST ALONG THE EAST LINE OF SAID SECTION 9, SAID EAST LINE BEING THE BASIS OF BEARING, A DISTANCE OF 2635.06 FEET TO THE EAST QUARTER CORNER OF SAID SECTION 9; THENCE NORTH 89° 36' 34" WEST 65.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF LITCHFIELD ROAD AND THE TRUE POINT OF BEGINNING;

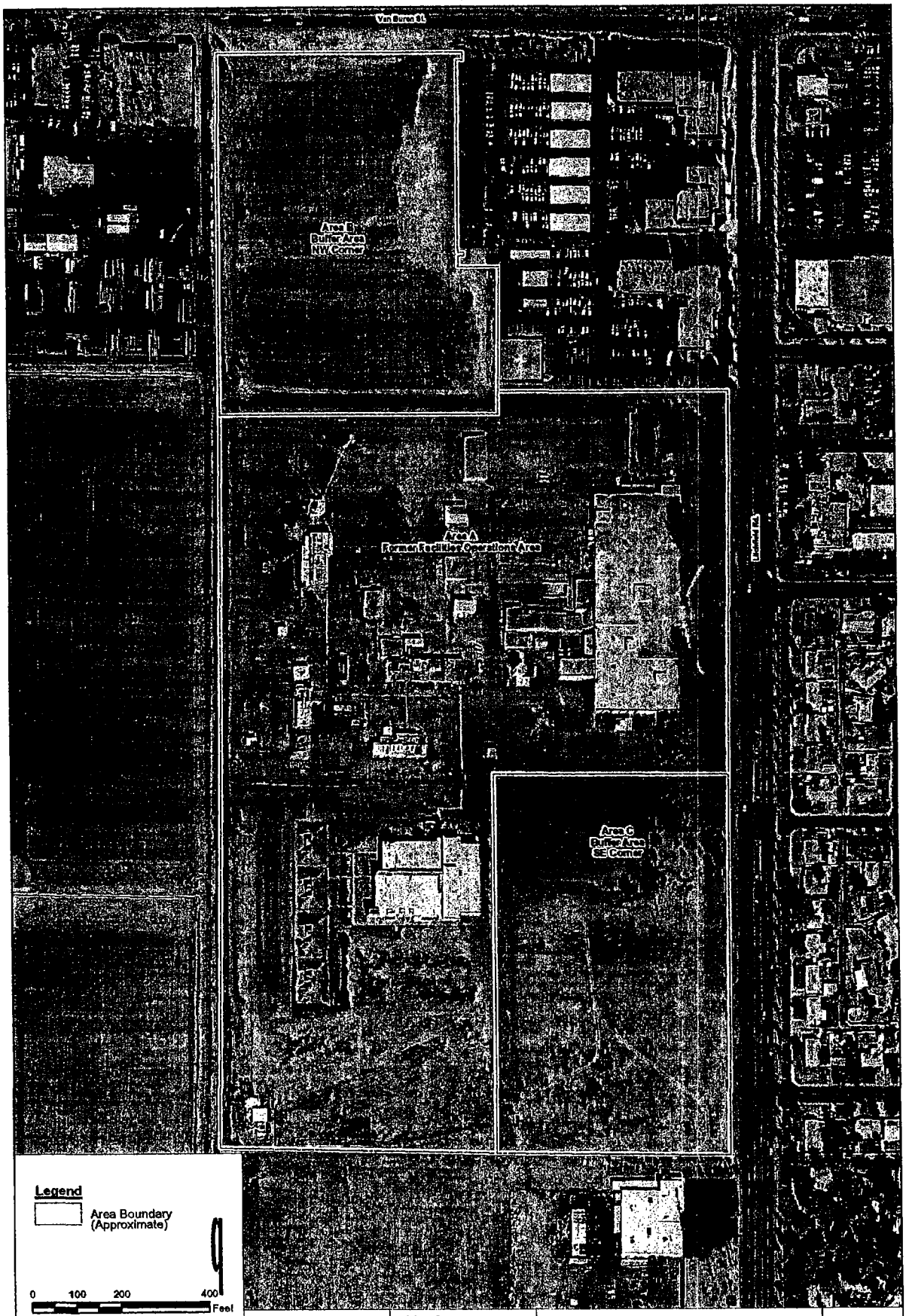
THENCE CONTINUING NORTH 89° 36' 34" WEST 540.00 FEET;

THENCE NORTH 00° 19' 47" EAST 868.46 FEET;

THENCE SOUTH 89° 31' 08" EAST 540.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF LITCHFIELD ROAD;

THENCE SOUTH 00° 19' 47" WEST PARALLEL WITH AND 65.00 FEET WEST OF THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9 A DISTANCE OF 868.10 FEET TO THE POINT OF BEGINNING.

SAID DESCRIBED PARCEL CONTAINS 468,870 SQUARE FEET OR 10.76 ACRES MORE OR LESS.



Projection Information: All data are displayed in Arizona State Plane, Central FIPS 0202. Horizontal data are in North American Datum 1983. North is geographic. Orthophotography is from the Maricopa County Assessor's office and geo-referenced utilizing a 1992 USGS DOQQ. Parcel Boundaries are based on MC Assessor parcel data (retrieved June 2005 at http://www.maricopa.gov/Assessor). ALL PARCEL BOUNDARIES ARE APPROXIMATE. This information is for general reference purposes only.

ARCADIS

Client: Crane
Project #: 987
Project Manager: R.Mongrain
Cartography By: A.Racki
Date: 06/02/2005

Former Unidynamics Phoenix, Inc. Facility
Facilities Area

Figure D

(G:\A_GIS\ENV_PROJ\987_Crane\Maps\Facilities_Area_200506.mxd)